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PERSONAL HEALTH

HYGEIA AND AESCULAPIUS

The ancient Greeks conceived of Hygeia as the Goddess of Health, while Aesculapius, with the serpent, was the God of the Healing Art. (*Courtesy of Hygeia.*)

PERSONAL HEALTH

BY

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"Our remedies oft in ourselves do lie,
Which we ascribe to Heaven."

Shakespeare.

PREFACE

"Personal Health" is written to meet the demand for a small, ractical book that will serve the busy person in shop or office as health guide and medical adviser. It is intended for the keen ndividual who wishes to make the most of his life and therefore o maintain and increase his personal efficiency. It is intended lso for those who are responsible for the efficiency and well being f others.

Various trustworthy reports have been published in recent ears dealing with the great amount of disability and sickness mong persons employed in all classes of work. On the other and, reports from certain industrial medical services have nown the unusually favorable results of instituting attention to ersonal health, both as an individual and a management problem.

The present book has been written after some seventeen years f medical experience with industrial health problems. The uthor is quite convinced that each worker is largely responsible o himself for his own well being. In "Personal Health," ccordingly, those things have been selected which have seemed ne most important, and no time and space have been spared in xplaining fundamental principles. Some afflictions cannot be revented, but probably 75 per cent can be warded off, or con- olled, through hygienic and medical knowledge now at hand. o enjoy these results, however, each one must be informed that e is his own guardian before most diseases begin and, too often, ven in the early stages of disease, and must know how to act order to fortify himself.

The close observer is constantly confronted with examples of ersons busy with their daily tasks in shop, office, school, etc.— agnificiently efficient—and the question arises as to how this fficiency is maintained. Some attempts have been made by the uthor to explain these phenomena, in the pages which follow. ndeed, hope for the "handicapped," or those already disabled, a perfectly natural expectation for him who gets in tune with e laws of health and the control of disease.

The author has discussed in some detail the purposes of the principal organs and parts of the human body which should be the common knowledge of all intelligent persons, so that their correct usage may be established by subconscious habit, and their continual betterment, not disablement, brought about by the tasks of the day's work. Since diseases, and particularly germ diseases, are the chief enemies of the human body, proper space has been given to them, their causes, symptoms, prevention, and early treatment.

Prior to teaching and professional work, the author spent some ten years, interruptedly, in the factories and offices of one of the leading manufacturing corporations. It has been his ambition in "Personal Health" to reduce the scientific terms used in medicine, and its kindred branches, to the everyday language of the intelligent worker in factory and office. Where this has been impossible, terms have been defined or explained.

Acknowledgments are made to Pyle's work on "Personal Hygiene," W. B. Saunders Company, for the special subject of the Eyes, and to Dr. S. Alexander Randall, who writes in Pyle's book, for the special subject of the Ears. The crisp rules for health prepared by Fisher and Fisk in their valuable book, "How to Live," have been elaborated, as a part of the last chapter. Thanks are expressed to the F. A. Davis Company for permission to use a number of passages from the author's monograph on "Occupational Diseases" which appears in Craig's "Diseases of Middle Life." The author is greatly indebted to Dr. John M. Dodson, editor of *Hygeia*, for permission to select nearly half of his illustrations from that excellent health magazine. Indebtedness is freely acknowledged to many original investigators for selections from their findings, published in scientific and professional journals. The present work also includes many deductions from the author's own observations on healthy persons and aged people. Many of the features discussed in the present volume have been put into actual practice by the author in his experience as an individual, a parent, a physician, and a professional hygienist.

It is to be hoped that each individual, while "acting as his own health officer," will necessarily grasp the wholesome idea of taking his or her part in the general public health program of the community.

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May, 1927.

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PERSONAL HEALTH

CHAPTER I

MYTHS, FACTS, AND IDEALS

We are told that man once worshipped the moon, but when, after ages, his wisdom increased and he discovered that the moon borrowed its light from the sun, he bethought himself more seriously and became a sun worshiper. We still have people in more or less remote parts of the world who keep up these practices. We call them "uncivilized," not only for this reason, but because they have equally funny notions about other things pertaining to common everyday experiences which do not concern us any more. It has, however, taken ages of development to free us of "mystics" as far as we have gone, and many are still with us who have misgivings about the matter.

According to history, when man's intelligence first began to raise him above the animal world about him, he began to arrange his thoughts into a peculiar system of mythology which, among other things, furnished an explanation of the reasons why he fell ill at times and also of the cure of disease. Among the earliest beliefs were the following:

1. That disease is the visitation of demons which must be driven out or charmed out of sickened bodies. This is called the "demonic theory" of disease. Some people still carry charms to keep sickness away.

2. That disease is a punishment for sins committed against the Deity or against pagan gods. This is called the "punitive theory" of disease and is often mentioned in the Old Testament of the Bible. In the sense that disease is often the result of the transgression of natural laws, this theory may be regarded as quite correct.

3. That disease is a miasm arising from the earth and appearing spontaneously, particularly from swampy and moist regions. From this we have the association with "malaria," or disease due

to "bad air." Thus windows were closed during the night to keep out these sickness-producing emanations. This "miasmic theory" of disease explained things quite satisfactorily for the ancient Romans. We now know that mosquitoes, breeding in their swamps, spread the malaria—not the damp night air—but still many people among us close the windows tightly at night to keep out the dangerous night air.

(*International*)

Fig. 1.—The South Sea Island "medicine man" claims to destroy the evil spirits which cause sickness. He has ancient traditions to support him. (*Dr. Ray L. Wilbur in Hygeia.*)

About 400 B.C., a Greek physician, Hippocrates by name, called the "Father of Medicine," performed for civilized man a service of untold value when he announced that disease is due to natural and not to supernatural causes. He paved the way, therefore, for an investigation of circumstances. To explain natural causes, he built up the theory that we had four "humours" —blood, black bile, yellow bile, and phlegm—which, when disease was present, got out of balance. We now know that his

"humoural theory" was unscientific even though on a natural basis, and it has quite died away, but in spite of his teachings, many remnants of the three earlier supernatural theories still remain today among civilized peoples. Many still believe that disease is some sort of supernatural visitation and, hence, something which cannot be helped.

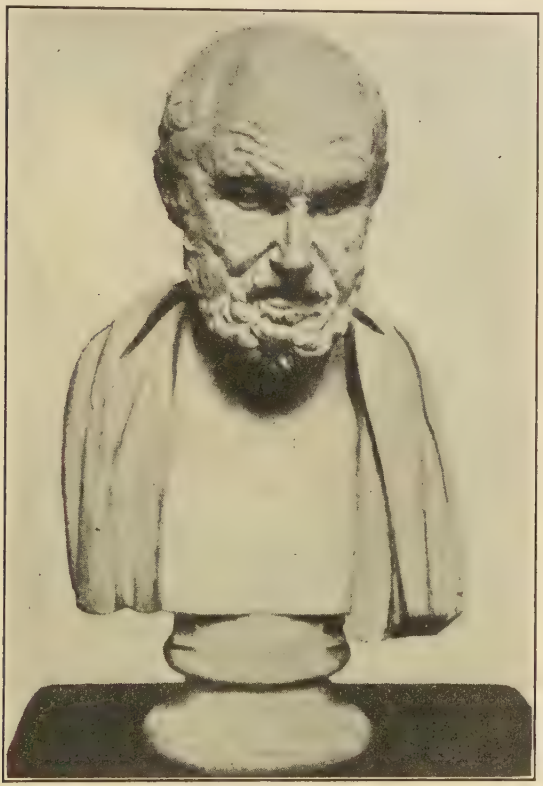


FIG. 2.—Hippocrates, who lived 400 B.C., was the father of the idea that diseases are due to natural and not to supernatural causes. (*Hygeia.*)

About 200 A.D., another famous Greek physician, Galen by name, extended Hippocrates' theories and built up the system which taught that disease is the result of lack of balance of the various "humours" or fluids *in* the body along with harmful *outside* influences such as heat, cold, moisture, and dryness. Thus the importance of natural outside influences was recognized centuries ago, but largely due to the lack of instruments like the

microscope (invented about 1680) and the absence of a knowledge of chemistry and physics, various explanations on a natural basis were usually unsatisfactory and full of flaws, so that the minds of people were always ready to revert to the old supernatural ideas.

This jumble of ideas, both supernatural and natural, yet unscientific, concerning the causes of ill health, remained throughout the Middle Ages and practically up to the present day.

It was next thought that disease arose out of filth and perhaps was due to germs which started in filth. Finally, Louis Pasteur, in 1879, proved that at least one disease, anthrax, a very fatal, contagious or epidemic disease in sheep and also in man, is due only to an infection with a vegetable parasite known as the germ or bacillus of anthrax, and not to demons, gods, miasms, "humours," or even filth. Similarly, Robert Koch, in 1882, proved that tuberculosis is due to the invasion of our bodies by another little vegetable parasite known as the germ or bacillus of tuberculosis. These were the first discoveries to prove that disease comes from definite causes which are capable of being discovered and, once discovered, of being controlled and perhaps wiped out sooner or later.

Many famous names have now become associated with the discoveries of the true causes and cures, or preventions, of many diseases. Perhaps Pasteur's greatest triumph was the proof that germs do not spring up spontaneously "because conditions are right," as in filth, sewage, offal, etc., but always come from a previous "seeding" of the substance by the germs or their spores, although the connections, as in contagious diseases, may be difficult to trace at times. The results of the discoveries within the past 50 years have already enormously reduced the amount of sickness and death which formerly took place. Furthermore, what is now known about many other diseases would greatly reduce the amount which is still with us if the knowledge possessed about them by a few informed persons could be spread faster.

Dr. Charles H. Mayo, of the famous medical foundation at Rochester, Minn., is quoted as saying that 85 per cent of human sickness is the result of germs. We know that infections even after injuries are uncommon in lower animals, especially animals in their wild state. Did you ever see a dog with an abscess? Such is certainly uncommon with them even though they are now domesticated animals. Germs must be looked upon in the same

light as parasites which destroy certain plants, particularly our domesticated food plants like corn, cabbage, wheat, etc. Even cancer may yet prove to be a germ disease and ultimately yield to man's triumph over germ life and parasites in general. I say this because scientists, particularly research workers, are rapidly learning the habits and weak points of these microscopic plants and animals, and have already succeeded in keeping one after

FIG. 3.—Louis Pasteur, the father of modern bacteriology.
(*Vallery-Radot's "Life of Pasteur," Doubleday, Page & Co.*)

another of them from invading our national boundaries—yellow fever, typhus fever, the plague, leprosy, Asiatic cholera, etc.

We have another serious item besides germs and parasites with which to deal. Intelligence, as possessed by man, tends to smother inborn, protective instincts; that is, we now live by our own directed thoughts or wills, by our educated desires, and less by "native" instincts. The blunting of the protecting influences of our native instincts undoubtedly helps very much to give diseases a chance to start.

One disease is so unduly common among youths of both sexes as well as adult people in general that it should be given mention at the start. It is out of all proportion in the working class. This disease is tuberculosis, also called consumption. Insurance figures show that tuberculosis is gradually dropping in practically all relations of life except in relation to occupation. It is also a disease which misleads the worker because its poison seems to stimulate his desire to work. In this way this vegetable parasite, *B. tuberculosis,* competes with man in his own tissues for his very life. It grows like a hardy weed whose roots are deep and, once started, like a Canadian thistle (which is a very good comparison to the germ of tuberculosis), the more you work the ground, the better it grows. Hence, he who suffers from tuberculosis should work very little, for he is only helping the disease. Instead, he should put himself under the care of the county or city tuberculosis society and follow instructions carefully.

When one says that he "does not feel like working today," there is invariably some health reason—a health strain—at the bottom of it. Such a feeling is abnormal. It certainly does not possess animals nor man in a full, healthy state. It is usually due to hidden ill health, if not to actual sickness, and is usually *not* due to some imagined overstrain of the day before. It is almost impossible to overstrain the normal man, keeping, of course, within limits of reason. If others so exposed or strained are not compelled to give up, then the fault too often lies in the individual himself.

The normal man wants to work; an unquenchable desire possesses him to work. In fact, he cannot be kept from working. The desire is within him, a natural instinct. Even on recovering from sickness he often rushes to work too quickly because the call is within him and his mind has not yet balanced its control of his actions. A low degree of ill health, the writer believes, lies beneath much of the cause for losing many jobs, for frequently wanting to change jobs, or for wanting to "lay off" for a spell. With our present 8- to 10-hour day in nearly all industries and callings, the human power within us should be easily able to cope with the usual strains of work without the recurring idea that one must "lay off for a spell." This is no argument, of course, against deserved vacations. Remember that the yearning for work is one of the instincts of health. It is, in fact, present and assertive even when the desire for wages is absent, or when the

condition of low wages is present. I shall attempt to show in the following pages that hard work of any useful kind promotes health, hardens the man, and prevents disease to a remarkable extent. I would at this point, however, state that hard work undertaken when one is not well surely makes for ill health. When one is not well, he is right in "laying off" from work. He needs all of his bodily strength and energy to overcome the disability or threatened disease which is at hand.

In the Boer War, Great Britain suddenly awoke to the fact that the physical development of the working classes was very inferior. The condition was so pronounced in the Great War that Lloyd George was forced to remark that it was impossible to make an *A*-1 nation out of a *C* class of people. He referred to health and physical welfare of the average Britisher. Similarly in the World War, our own army drafts showed 28 per cent of our most auspicious age in life, 21 to 31 years old, refused for military service of any kind, while Major General Leonard Wood declared that upward of 50 per cent could never be used for first-line troops because of their poor physical or diseased conditions. Recently the New York Academy of Medicine examined 958 persons, representing wage earner's families and composed of various races, both sexes, all ages and

> . . . various degrees of limited wealth, who did not consider themselves in ill health or were obtaining no medical care for conditions of which they were aware, but for which they believed medical treatment unnecessary . . . Of the 958 examined, 24, or 2.5 per cent were found to be in good health; 697, or 72.7 per cent needed definite medical treatment (this number included 214 who needed, in addition, advice as to habits and personal hygiene); and 237, or 24.7 per cent, needed only hygienic advice to correct or arrest existing errors of bodily function or defects of structure.

The average worker today loses from 8 to 10 days from work each year on account of sickness. This seems unreasonable in a so-called civilized community which has discovered how to fly through the air at 300 miles an hour, to communicate between points thousands of miles apart by a simple little contrivance called the "radio," and, in our country, to provide an automobile for every five or six persons. This rate of sickness really means that many lose from 20 to 60 days each year, because many are not sick at all throughout the year and this helps to bring the average down. In some manufacturing and mercantile establishments which

have organized a medical and health department, sick days have been cut down to as low as 4 or 5 days per person per year and even lower. The writer knows many hard-working people in many lines of work who have not been sick for periods covering 20 to 40 years, many of whom are not particularly blessed with superior physical abilities but who appear to be blessed with a common-sense habit of taking care of health first. This is true health efficiency and it is the end desired.

In an average community a certain number of people will die each year. The number who die out of 1,000 population each year makes up the so-called general death rate for that locality. The average death rate for the United States at the present time ranges about 12 to 13 per year. Perhaps one or two of these have died as the natural consequence of old age, but the causes of death for most of the balance could rightfully be made the subject of a grand jury investigation if we were up on our toes and attending to things worth while. In fact, with the knowledge at hand, it is said that this rate could be reduced to 7 deaths a year out of each 1,000 population. This rate has already come to exist in Panama which, only 25 years ago, was probably the most unhealthful and "sure-death" spot in the world. This low rate has been almost paralleled in some other parts of the world, as in Australia and New Zealand. Man's ingenuity, his discoveries, and his enforcement of certain truths, which we term "health and protective regulations," have brought this about. In fact, it is plain to be seen that man's personal welfare in crowded, civilized sections of the world is being steadily advanced, like his strides in chemistry and physics, in the general process of "science rebuilding the world."

People in general should get over the traditional idea of the "survival of the fittest" as being a natural, or God-given, plan for the advancement of those who are fortunate to survive. In civilized communities, if left to run without scientific health supervision, it is often the most fit who die quickest in epidemics of disease, while those of more animal characteristics and usually less intelligence and actual fitness for their places in society and industry manage to survive. How often do we see a hard-working, conscientious citizen taken off in a spell of sickness, as during an epidemic, when his "no-account" neighbor, who perhaps introduced the fatal sickness into the community, succeeds in escaping!

This brings us to the statement that the health of civilized man is not self-assured. It is neither guaranteed when one is born nor is it self-promoted. Perhaps it was more so for original man and it is said to be more so for the native savage today. The reasons are plain: our domestic life, our habits of daily work, our crowded houses and shops, and the very "unnaturalness" of our lives, when we stop to consider them. In order that man may resist

FIG. 4.—Instinct *vs.* intelligence. The South American savage cured his malaria by drinking the bitter water at the roots of a certain tree from which science later extracted quinine. (*Dr. R. E. Stifel in Hygeia.*)

disease and live out a reasonable span of life in any civilized community on the earth today, it seems, without question, necessary for him to use his wits. In fact, he must consider these points as part of his necessary education and give them some thought every day of his life.

As previously pointed out, in civilized communities those protective instincts inherited from savage ancestors appear so

blunted by habits and conditions of the time that most of them have long since ceased to protect us. In a word, having tampered with the "knowledge of good and evil," civilized man is compelled to protect his life and health by knowledge, that is, by careful planning and much strategy. It is a matter of study and intelligent guidance.

"Every man his own health officer" would greatly advance community health status provided every man thoroughly understood the laws of health, especially personal health, and was inclined to obey the dictates of his wisdom and understanding. Still, by degrees, all can be encouraged to advance in the proper direction.

Leading educators in the past few years have put health as the first of the "seven cardinal principles of education." This has come only as the result of long deliberation upon the purposes of an education. It is true that as yet the majority of educators are probably not putting the item of "health first" in their daily teaching programs, but the principle is correct and, we feel, must finally gain its proper position at the front. Else, what is life worth to him who has become educated or skilled in a chosen calling, but who lacks physical or mental stamina to pursue it?

The citizen in any line will do well also to promote all inventions and discoveries which cut down manual labor, especially of the monotonous, unskilled type. He will do well to encourage and adopt all improvements or methods which hasten production and decrease the length of the work day, since this leads to the time which is now most surely approaching when all normal men and women will be able to make a living in half a day's time. This will come about purely as the result of the adoption of new discoveries and quicker methods which, experience shows, have invariably increased the wage income at the same time. Such an attainment will leave the rest of the day for home building in the broad sense, for recreation, for developing hobbies in enjoyable lines, for study and thought and culture, especially for giving service to the community and to less-fortunate members of the race, and for intelligently supporting the advancement of truth in everything. We should not be misled because some skilled trade, like last-making, for instance, has been put out of business by progress of the times, in this case, by mechanical inventions. Where one calling or trade has thus suffered, a dozen or more have really been put upon their feet.

Take, for example, the wages and conditions of work of the type setter as compared to the modern operator of the type-setting machine. Inventions which remove the necessity for manual labor always greatly increase the demand for the products made. This at once increases the steadiness of work, and even during the period of changing, none are so well equipped to undertake the new methods of work as those who are already following the line affected. In a country where manual labor is supreme, as in China, wages amount to as little as 10 cents per day. In countries where production is increased as the result of man's own inventions and improvements and methods, as in our own country, salaries and real wages are the highest known in the world. These things, of course, increase the satisfaction of a worker at his daily task and fire him to a higher plane of ambition and love of peace, while adding greatly to his personal health, wealth, and his increased lease on life.

There is good reason for believing that everybody ought to live three score and ten years. This ought to be the average span of life for all men and women. Certain scientists have declared that there is born in man the power of living a useful and productive life for 100 years. Although we are making progress in this direction, the average man in the United States now lives 54 years, and the average woman, 56 years. Some countries have already beaten us. For instance, the average life of both sexes in Australia is now put at 64 years. Park says:

> It is astounding, however, how much of the gain in years which has come about for the average man and woman of today is due to victories over the communicable diseases, and how relatively little has been done yet through better popular appreciation or application of the laws of personal hygiene.

I think it is not a wild statement to declare that most *sickness will be practically abolished,* in time. Even now it is said that 50 per cent of it could be stopped if the knowledge already at hand were learned, believed in, and acted upon by the people in general. Death is conceived of as coming some day in the future as a quick and painless process, as simple as a sleep overnight; or, as the end of the "one-horse shay," so carefully built that it fell to pieces at exactly the same instant and after 100 years of use.

The day will surely come for the average man and woman when life will end quite spontaneously and not after years of physical

decline and much suffering during which one is forced to put up a losing fight against germs, cancer, heart disease, etc., or to witness part of the body as useless as if dead, while the remainder is trying to survive.

It is a trait of human beings that they delight in each other's society. They like to assemble. Man is a gregarious animal. In primitive times and in wild places, banding together was for united protection, but beyond this man also enjoys association with his kind, for pleasure, rivalry, stimulation, etc. From this native instinct spring unified efforts—our business enterprises,

FIG. 5.—Science is rebuilding the world. It is also rapidly banishing many diseases. (*Dr. T. B. Rice in Hygeia.*)

schools, lodges, unions, clubs, societies, and associations. While admitting that such assembling habits tend to spread our communicable disease, can we not take advantage of them?

The fact that a person belongs to a group of some kind really gives him a peculiar advantage over the isolated individual because he can use this group or organization to make so many desirable movements more effective. Usually all that is necessary is to get a goodly majority of members in favor of the given idea. Many organizations now have a "sick committee." Should they not go a step farther? Should they not create a "health committee," a standing committee which is constantly reporting health matters and analyzing the causes and prev-

alence of sickness? The results of using an organization for this purpose would, I am confident, soon so establish themselves as to make that organization a superior body of persons whether youths, men, or women. It would also attract the notice of various superiors, directors, and employers in different walks of life who are constantly seeking better assistants to help them in their enterprises. One does not need membership in a special physical culture club, athletic club, or team, etc.—not to disparage them at all—but a committee on health should be considered as one of the standing committees in almost all organizations.

Summary.—From dim ages beyond written history have come down mythical ideas regarding sickness which, coupled with centuries of observations of unscientific nature, still disconcert us greatly as we come gradually into the light. Civilization is dulling our natural protective instincts, but at the same time science is rapidly advancing our welfare of body and mind. Even today we are gainers, but in only a small way, we feel confident, when we look at the possibilities of the future. Work should lead to health. The present shows that many are handicapped who should not be so and that enough knowledge is now with us to increase personal efficiency and prevent disease in a decidedly increasing manner. We should urge on the changing period through which we are passing in this age and use every authentic means of reaching the time when all will live healthier, longer lives, work less, especially at meaningless labor, and enjoy a more perfect life in the world of the near future.

CHAPTER II

WHAT IS HEALTH?

Without mincing words, health is the ability to stay well. All other definitions are beside this one, which includes the idea of resistance to disease, and the ability to recover quickly and completely from injuries or from the attacks of disease. This ability, unfortunately, is possessed by but a comparatively few persons

FIG. 6.—Old age has come to this man more than 30 years too soon. He is only 40 years old.

today. This ability cannot be measured by the general appearance of the individual, by his physical build, by his muscular strength, by his athletic powers, or by the absence of them. Our methods of measuring or estimating health are not perfected, but among the best of them is the discovery that the absence of physical defects or physical impairments, which is ordinarily easy to

find by having a physical examination made, is pertinent to health.

That person who can pass through the years, year after year, without a day of sickness, without a health complaint, is the healthiest and has the best prospects of a good old age. This point is important because we are so apt to confuse strength, or unusual physical or mental ability, with health. On second thought, we know that such cannot be the case, since the most robust succumb to common afflictions like pneumonia or tuberculosis or typhoid fever and the like, just as readily as the physically weak. The resistance to disease bound up in man's tissues constitutes the degree of his health. Impairments, defects, or diseases of the teeth, throat, ears, eyes, heart, kidneys, liver and intestines, etc. tend to undermine this inborn or inherited resistance.

If one never had health, he surely is out of luck. Fortunately many times when he has lost it, good old Nature has come to his rescue and restored him. On almost each occasion, however, when he has lost it, a truthful inquiry would establish that somebody was at fault, usually himself.

Health is maintained by hygiene is all its branches.[1] Hygiene is the philosophy, science, and art of holding onto one's inborn well-being, of checking disease when it once starts, and further than that, of preventing sickness from getting a start. Hygiene also prompts one to increase his physical and mental powers to constantly higher levels, the limits of which we do not know. Finally, hygiene is the most potent factor in continuing the race of human beings, in the face of the competition of other forms of life, by enabling us to be the parents of normal, healthy offspring and therefore of virile individuals for the next generation.

In the curse said to have driven man out of the Garden of Eden—because he was curious to exercise the intelligence which he possessed above all other forms of life, and which punishment has forced him to earn his living through all the generations since by the sweat of his brow, as no other animal does—man has been allowed the superior pleasure of enjoyment and satisfaction as he fulfils each of his labors, his instincts and his desires. His health

[1] The author's definition of hygiology, or hygiene in the broad sense, is: that study which treats of the philosophy, science, and art of engendering well-being, maintaining the same, increasing its possibilities, preventing disease, and providing for the normal propagation of the species.

instinct is one of these. All normal labors and instincts when satisfied, whether they are of ordinary work, hunger, love or whatnot, return a peculiar reward bound up in the word "health."

The healthy, able-bodied man or woman is one who can usually scoff at most misfortunes for, where health remains, almost any possibility remains. Scarcely any catastrophe leaves a healthy man defenseless, hopeless, or whipped. No perfectly healthy man was ever a quitter. As the old hymn goes, "The Christian's trials only refine his metal and separate the dross from the pure gold that is within," but I cannot forbear adding that a most important constituent, as far as his earthly welfare goes, is his health as a major factor in the refining process.

I once heard Grizzly Smith, the great scout of the Oregon country, in one of his absorbingly interesting gospels of the great outdoors, tell of his reaction when he was apparently faced with death from starvation, or by wild animals, when he thought he had broken his back. The mishap occurred years ago in a distant part of the mountains far from the habitations of man. Armed with a rifle, revolver, and hunting knife he had attempted to kill an enormous grizzly bear which was up a ravine a hundred feet or so beyond him.

His first rifle shot only sent the bear into a frenzy of rage and brought him pell-mell down the ravine toward Grizzly, who had but one rifle shot left. He reserved this shot until the bear was within 4 or 5 feet of him, when he banged away and put a mortal wound between the animal's eyes. The speed of the on-coming monster, however, was so great that before Grizzly could step aside, the bear's great weight fell upon him. Or, perhaps, he stumbled in attempting to step aside. Anyway, he fell backwards and hit his head on a stone which knocked him unconscious.

Several hours afterwards he revived to find the body of the dead bear lying upon him and so heavy that he could hardly breathe. Also, he had lost considerable blood from a scalp wound where his head had struck the stone. Far worse, however, he found that he was paralyzed from the hips down. This was due to the fact that, in falling, the stump of a small tree was in the way so that his back hit squarely upon it.

Faced with the horrible realization of what this meant, Grizzly says, "I instantly decided to live until I died, anyhow." Now it took a man imbued with all the qualities of health to utter that statement, particularly, as he still had his revolver and hunting

knife all too handy. With the use of only his arms and shoulders he managed to eke out an existence by elbowing himself along from place to place in search of food for a matter of many weeks and until winter was well upon him. One joyful day he began to experience a little feeling in one of his legs and presently also in the other. He gradually recovered completely! Had health anything to do with this? Perhaps mental health saved him from self-destruction, who can say?

The healthy man is primarily honest, according to a leading employer of labor in the world. He instinctively admires the truth whenever he sees it and will go out of his way to defend it any time. That ill health may be a primary factor in deceit and dishonesty is something of a new thought. Perhaps ill health has to do in this case with the mental condition underlying shiftless irresponsibility. At all odds we should be glad that bodily ill health is not always associated with such qualities.

Without doubt bodily health leads up to clean mental insight and offers a great protection against rash or impulsive actions and upon the making of unwise business deals and so-called foolish bargains. The truly healthy man, for instance, will rarely make a wage contract that is an insult to his ability. Furthermore, he is never a whining dog. He can balance gentlemanly modesty, humbleness, and charity with qualities of assertiveness and demands for personal rights, and make the truth of a situation stand out so positively as to down unfair advantages. He is also one who can better control his selfishness, an instinct of self-defense which he has inherited, and one who can best become a true partner in the welfare of any business. He is not one given to spells of dissipation, drunkenness, flimsy sickness excuses, or streaks of unreliability.

One does not usually go to the Bible in support of scientific discussions, but there is as much inspiration in the Good Book for the scientist as for the churchman or the "fundamentalist" if one considers it carefully. Witness the following extracts:

Seek and ye shall find.

Knock, and it shall be opened unto thee.

By the truth shall ye be saved.

Let man have dominion over all the earth, and over every creeping thing that creepeth upon the earth.

My people perish for the want of knowledge.

Have those who criticise caught the true spirit in that Book after all?

On What Does One's Health Depend?—The answer to this important question is the subject matter of the following chapters. It lies in the answers to seven questions:

1. Whence came I? My parentage?—My ancestry? This constitutes the subject of heredity, while the subject of eugenics attempts to bring into the world better children by more careful selection of mates or lovers.

2. Who am I? What are my physical and mental perfections and impairments? It is the main object of physical examinations to answer these questions.

3. How do I keep myself? This is personal hygiene.

4. How healthful are my surroundings? What are these influences upon my health? This constitutes the subject of sanitation, or euthenics.

5. What organized effort is there to protect my health and well-being, especially in the community in which I live, or may have a vote? This is public health, its organization and administration.

6. In case of breakdown, what support have I while I am sick or disabled? This considers the subject of insurance.

7. Am I guaranteeing my offspring a healthful start in life? This completes the circle back to eugenics but adds the responsibilities of parenthood.

So much for the person. What is the cause of sickness? We recognize all disease as due to but three causes: (1) biological, causes in which germs and microorganisms, both plant and animal forms, play the principal part, and poor nutrition plus heredity play the remaining part; (2) physical causes, such as direct injuries and strains, heat, cold, dampness, light, etc.; (3) chemical causes, such as definite poisons, fumes, or vapors, which weaken or destroy body cells and tissues. With such knowledge the modern physician prevents, stops, or cures disease.

Any line of treatment which is not based on these objective facts and an appreciation of their relative importance is haphazard and unscientific if not dangerous and worthless, and any alleged benefits or cures from fad methods of treatment are purely matters of chance; for we must keep in mind that many sudden diseases called acute diseases, and "spells" in the course of chronic diseases, recover of themselves even without treat-

ment. The danger is that they may not, while some diseases may also be contagious and infect others. Some forms of treatment for illness are specific and quick, some slower, while some alleged treatments actually hinder. When sickness or disease threatens, therefore, the necessity of first-class supervision and treatment by well-trained professional persons is plain (see p. 74).

Summary.—Realizing that health is the ability to stay well and that this is attained by study and that it is not, as many believe, bestowed upon us as a birthright, we see the unlimited possibilities in the human being. Many of the flaws in life are fundamentally transgressions of the laws of bodily health. The Bible encourages us to seek and, having found, to develop. Personal efficiency depends upon wisely manipulating some half-dozen factors pertaining to parentage, physical well-being, and personal and community conduct. Those things like diseases, which would mar one's health and personal efficiency, are being found out and stopped, but one must look out for "quacks" and ignorant "doctors" in the healing art.

CHAPTER III

WHO AM I?

Socrates said: "Know thyself."
From O. Henry we read:

Out of the towering flat crags and apartment peaks of the cliff dwellers of New York steals an army of beings that were once men. Even yet they go upright upon two limbs and retain human form and speech; but you will observe that they are behind animals in progress.

For our purposes, the answer to the question "Who am I?" is a matter of taking stock of the human machine in which one finds himself encased. Ordinarily, few of us have ever given this much thought. We have noted that, according to some regular plan or natural law, we have grown up more or less resembling one parent or the other. We have noted that we are larger or smaller, stronger or weaker than somebody else. If we have been unfortunate enough to have suffered some severe sickness or accident, we may be conscious of the fact that we have been somewhat weak, perhaps, since that time. Perhaps we have found that we have apparently been stronger or added weight since that time. We may have noted also that we have a weakness in our bodily resistance to certain kinds of sickness such as colds, coughs, ear trouble, skin eruptions, dyspepsia, or something of the kind. We may have noted that we can or cannot stand certain exposures or strains like someone else. In fact, each one is apt to have his or her peculiar "pet" weaknesses.

Further than this, few of us have rarely inquired or looked deeper. We have rarely inspected ourselves, at least in anything at all like a business way. We have, indeed, inspected almost anything else which we own much more carefully than ourselves. Many have felt something of a lack of desire to do so feeling that some unalterable influence or the power within us is taking care of these matters for us, a good enough philosophy is we were not surrounded by civilization's pitfalls. We may also have been fearful of running onto something which might worry us and so prefer not to know anything about it in advance. As

indicated, such a policy is surely a poor one for anyone to adopt in connection with any valuable possession. As civilized and intelligent human beings, it is apt to be a disastrous policy in the long run; in fact, such is the case in more than three-fourths of all chances taken.

It is a custom today to call a man's body a machine, a human motor, but the workings of it are mysterious and have not been figured out very well or very completely.

Like an automobile engine, we know that it takes fuel (food) and air; also it has a circulating system and an exhaust or waste-removal system to make it run. But we don't know how Nature does it at a temperature of only 98½° when the engine requires several hundred degrees, nor do we know why the human body gets 40 per cent efficiency out of the food it takes in, while the engine is said to be a good one if it gets back only 15 to 25 per cent of the fuel energy it takes in.

There is another difference worth mentioning: The more you use an engine, even without abusing it, the quicker it wears out; but the more you use the human body—I loathe to call it a machine simply because it has some behaviors like an engine—the better it works. Of course you must not abuse it either. Therefore, work wears an engine out, but makes a human body get better day by day. One's body improves with work, while loafing weakens it. Therefore we are made to work; it keeps us in health and keeps us happy; only there must be some sense about it, not too much, not too little, and especially no disease present.

Only over a part of our bodies do we have any direct control; the rest runs itself, runs automatically day and night—it is the vital part—and this vital part is increased in power or damaged as we obey or disobey certain laws which we call, for convenience, Nature's laws. For instance, the right amount of sleep, or the right amount of rest are Nature's laws and we are given warnings such as *sleepiness* or *tiredness* to tell us when we are putting the vital parts in danger.

Unless one is a trained physician, he is not apt to get very far in a self-examination, and even then one physician usually gets another for that purpose. The ordinary person will usually not find it worth while to conduct even a superficial examination of himself, because he is ignorant of what indicates either a good or a bad condition. Some things, of course, he can make out, such as poor eyesight, bad hearing, bad teeth, stiff joints, rupture,

flat feet, and perhaps a few others. He will, however, not feel as certain of his findings as the writer who is a physician, nor as a mechanic, who looks over his automobile to detect some looseness, or to prevent some breakage from occurring or, perhaps, to find out why it has begun to run irregularly. In this respect, I have surely found by experience that it is an expensive waste of time for me to try to find out and correct much of anything about my automobile when I can turn it over to a skilled mechanic for

FIG. 7.—Once a visit to the doctor was to talk over disease. Now healthy persons come for guidance in keeping healthy. The painting reproduced is by the German artist George Thieme. (*Dr. Lenna L. Means in Hygeia.*)

an hour or so and get expert work and safe results while I am attending to my own business.

In the following pages I shall attempt to point out some few methods of examinations which the individual may make on himself. But there is no question that he saves much time and expense in going to a regular physician for the purpose.

For adults, one good physical examination should be made with a follow-up at least every 2 or 3 years, but much more often if any disease is found present. After 35 to 40 years of age it is very advisable to have a physical examination every year. As is customary in taking a business inventory, some fiscal date should

be used, and what is more logical than to take one's birthday each year for a "once over"? A physical examination, to be worth while, must include the following things:

1. An inquiry by a regular physician, not one who is a member of some cult or the promotor of some fad in health work, physical culture, or outlandish treatment of disease. The physician who examines you should be one who had a full high school training before he studied medicine and who then took from 4 to 7 years special training in a first-class medical school. To find this point out, consult an American Medical Directory (ask the librarian at the public library) which lists every licensed physician in North America and records information taken from state licensing boards, and which also indicates several other things about the given physician which may be of considerable importance to you. It would be well to have some official list of the first-class physicians in your community, the basis of the list being the education and training which each physician has had, and to pay little attention to any who are following certain beliefs or sects. Scientific medicine, like chemistry, has no sects; things either are, or are not, or are not known as yet, and one's belief one way or the other will not change the facts.

2. The physician should make an outlined or standard inquiry into your past health, the sicknesses and injuries which you have had, as well as those of your family and relatives. The medical profession now has adopted a standard blank for this form of inquiry. You are foolish if you keep anything concealed because you are defeating your own purpose and injuring yourself. This inquiry is a confidential matter between you and your physician, and he can be held to the law if he violates it in any way prejudicial to you.

3. The physician should next make a physical examination which requires stripping off your clothes and which will take at least 30 to 60 minutes. If you are practically normal, it will take less time; if something is doubtful or wrong, it will take more time.

4. There should also be a laboratory examination of the urine, blood, and perhaps other things. By all means your blood pressure should be taken and your heart and lungs examined with the stethoscope and by other means.

5. A teeth examination should be made by a first-class dentist whether or not you have suffered any toothache or other tooth trouble in recent years (see p. 43).

6. Finally, perhaps an X-ray examination of the teeth, lungs, heart, and, occasionally, bones and other parts, may be necessary.

The next physical examinations will usually not take so long nor be so expensive. The cost of a physical examination may amount to considerable, as when there is no organization to look after it, or it may be insignificant, as is the case in colleges and public schools where physicians are employed on salary for that purpose. Every family physician, provided you have selected a well-trained man, is just as willing to give the best of his efforts to this matter of health examinations as to his usual work of treating diseases. The average cost under a specialist who has surrounded himself with several assistants will perhaps be about $25 to a working man, but this will depend more or less upon the amount of laboratory work which is necessary. This cost can be much reduced by organized effort. The organization to which you belong can easily arrange for physical examinations of members, as many lodges, fraternities, industries and associations are now doing. The advantage also is that the records are kept by the physician whom you yourself help to choose and only you need know your immediate defects. Your employer or lodge may or may not want to know how you classify, *i.e.*, whether you are an *A*, *B*, *C*, or *D* man.[1] In fact, anything more than this is no one else's business.

In this classification, an *A* man is one who, so far as his health is concerned, can do any kind of work; a *B* man is one who has some physical or other impairment but can perform practically any kind of work within his strength, because his impairment does not interfere with his ability to work; a *C* man is one who has some ailment or physical defect at the time of examination, as a rupture, for example, which should keep him from working at certain things and which would make it necessary for the physician to decide whether he ought to accept or stay in a certain position; and a *D* man is one who, at the time, should not work at all. A *D* man is usually one who has a disease which might be spread to his fellow workers, one with a bad heart, one subject to epileptic fits, etc. Very often a *C* man and even a *D* man will be classified higher on a later examination, due to corrective

[1] These symbols should not be confused with those used in many colleges where *A*, *B*, *C*, *D* ratings refer to posture defects; nor with those used in rating mental levels.

treatments, or an operation, or having the teeth fixed or a blood disease cured.

But the chief value of a physical examination does not consist in getting a list of your ailments and the extent of them, but in getting solid advice from the physician on the methods of overcoming your defects or impairments and on the prevention of certain diseases common to your period in life and especially in regard to certain tendencies which you may show, such as overweight, underweight, high blood pressure, weak lungs, weak heart, goiter, and the like.

The great value, financially speaking, of dental prophylaxis, that is, having the teeth regularly examined by the dental hygienist once or twice a year, is already evident to a great many people. In one family of six persons, for example, where dental bills customarily averaged $50 to $100 per year prior to 1919, and where the habit was then established of going to the dentist every 6 to 12 months by each member of the family, the expense fell to between $10 and $25 per year, for the whole family including all necessary repairs, cleansing of teeth, etc.

By this plan of taking an inventory of yourself, with experts on the job, you can be almost certain of decreasing and perhaps abolishing most of the diseases common to man, and of increasing your span of life, perhaps by many years. One or two large insurance companies have proved this in connection with their policy holders. In fact, a medical director of a large company says that by physical examinations of some 6,000 of its policy holders over a period of 5 years, it reduced expected deaths from about 420 to 250 in that time and saved $77,000—a 200 per cent investment! By its total program of welfare work, public health nurses and physical examinations, it saved 52,000 lives in one year (1922) of persons who would otherwise have died that year in the ordinary insurance experience and whose claims would have amounted to $11,828,743. The writer inquired of the chief statistician of this company the cost of this welfare work for its policy holders and was told that the figure was $2,647,136. Did it pay the company? Didn't it pay the policy holders? This prompts me to observe also that insurance companies, which are in the business of making money out of the life and death problem, never employ any but regularly licensed physicians to carry on their medical work.

A very valuable point to physical examinations which medical science has brought about is that of making one immune to certain diseases. By means of vaccination and similar methods one can now be protected absolutely from smallpox, typhoid fever, diphtheria and scarlet fever; also a large amount of protection may be brought about for other diseases such as lockjaw, dysentery, colds, influenza, pneumonia, whooping cough, hay fever,

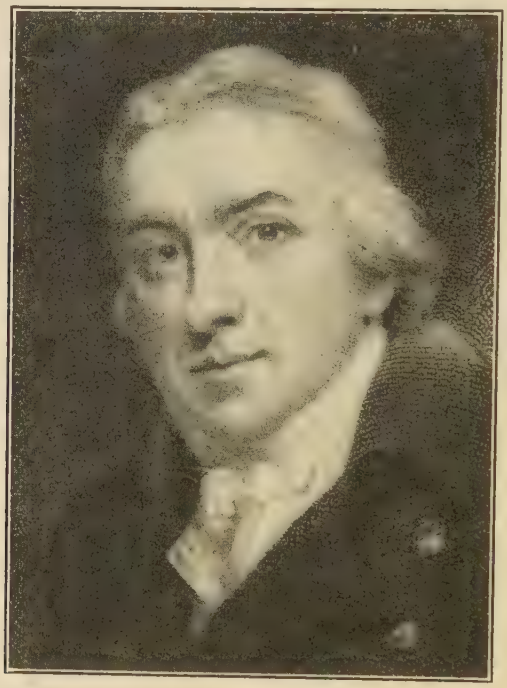


FIG. 8.—Edward Jenner, the discoverer of vaccination.
(*Permission Dodd, Mead & Company*)

asthma, boils, and certain other afflictions. We hope soon to see measles, all forms of pneumonia, and even tuberculosis added to this list. The day may not be far off when we may be protected against cancer, which is now a more common cause of death in some states than tuberculosis. To these we should add the specific protection or cure which can be had by means of drugs, serums, or vaccines for goiter, diabetes, syphilis, hookworm, infection, malaria, and several tropical diseases.

A health examination should be arranged for in advance by making an appointment and not merely by going to the doctor's office when it may be crowded and when his thoughts are being devoted to the diagnosis and treatment of disease. A physical examination will usually require much more time and careful estimation on the part of a physician than he is required to give when he makes a call upon a sick person even to make a diagnosis of some disease which is present, just as in an engine which has stalled, an expert workman can oftentimes find out exactly what is wrong in a very few minutes while it would take much more time to make a general overhauling. Before leaving the doctor's office, insist on getting a set of written directions to follow. Neither you nor the doctor should expect to leave such important details to memory.

Some warnings should be sounded to the average person. Sir George Newman declares that this is the "golden age" of medicine. He says:

> Unperceived it is rapidly changing the face of the world and the destinies of men. The extension of the frontiers of life is assisted by fresh air and sunlight in dwellings, sanitation of workshops, wholesome water and food supply, and the isolation of infectious persons. The result of this is seen in the fact that every child born today has an expectation of 12 years more life than had his grandfather.

It is also true that, in keeping up such progress, many humbugs and commercialized schemes are being thrust upon the unsuspecting public. I take it that the healing art is in the same ethical classification with religion and the ideals of community interest, none of which should be commercialized. It is, of course, necessary to have the healing art upon a business basis. Even a church cannot be run successfully except upon a business basis, but any such thing as making "big money" out of this field is not to be countenanced. Furthermore, the healing art should be upon the educational basis of proper training for such work; not upon some sectarian fad or notion which somebody has. The best solution of this problem for everyone is to consult his or her family physician. Select a physician in whom you have confidence, and do not be led astray by flaring advertisements and other methods of the quack or of the medicine vendor.

It is interesting to note that while the shortest-lived people today are probably the Hindus, where the figure is 22 years as against our 55, it is especially to be pointed out that it is not so

much long life we wish, as a life free from sickness as much as possible. One writer puts it this way:

> The medical profession, instead of trying to make us live 150 years, might intensify more at making us healthy while we live our short span. Elimination of colds would be more valuable than any possible result of monkey glands.

CLOSING REMARKS

"Spend a little money on the faithful old machine itself, less on driving it." "Health enriches life." Health explains those "bundles of energy" whom we all know who are "at it daily" for years, do twice as much as other people, live longer, and live better. The "individual must wake up and take his or her own part." Environment and the work of thoughtful others can't do it all and can't be trusted too far. Care of health is a matter of personal and social obligation.

Most ill health is ignorance. Don't blame circumstances; blame lack of foresight. The aim should be not to find out how well you are, but to find out how much better you could be, what is the weak part, and how to increase its powers.

The health examination is a springboard, not a transient way station. Don't accept ill health as your lot. Have a personal ambition to achieve real health. Turn your health into achievement. Realize your ambitions. Don't let the specter of ill health stand in the way. (*Women's Foundation for Health.*)

Before sickness or disease actually exists, there are certain signs and earmarks pointing toward disease which the physician can find, tell you about, and advise you in checking. When definite symptoms of ill health are present, disease is close at hand as a rule, perhaps constantly there. The examination will probably find it. Trivial details are emphasized in health examinations more than in medical examinations on the same basis as stated above, that it is easier to find what is the matter with a machine which has stopped or which does not perform correctly than it is to overhaul the whole machine for possible defects which have not yet become self-apparent. Are you in business for your health? If not, you ought to be, if for no other reason than that you should put your health and well-being into your business and service.

Summary.—This chapter considers the importance of an inventory of oneself, part of which is done by a self-inventory

and part by a physical examination in the hands of the physician. From this we become classified, arbitrarily, it is true, as to efficiency at the given time and also gain forehand knowledge pertaining to lengthening of life and the value of periodical inventories as the years go by.

CHAPTER IV

HOW DO I KEEP MYSELF?

Personal hygiene, the subject of this chapter, is the greatest of all factors in maintaining health. About a century ago it was thought by the "wise ones" that most sickness was due to filthy conditions of living. The sanitary engineer came forth and soon bettered water supplies and, later, sewage, refuse, and waste disposal, and it was hoped that such would practically solve the question of sickness in civilized communities. While great improvement was noted as the result of the efforts of the sanitary engineer, not as much resulted as had been hoped.

Following Pasteur's and Koch's discoveries in bacteriology (1875-1880) there appeared the bacteriologist with his ability to discover a definite germ for each of many diseases, particularly contagious or communicable diseases, and he added knowledge of the use of disinfectants and later of antitoxins and serums to protect against or to overcome many diseases. Again it was hoped that disease would practically disappear as the result of the efforts of the bacteriologist combined with those of the sanitarian, but such was not to be the case. True, much reduction in certain forms of sickness has followed the efforts of these combined with other discoveries principally by medical men, but the general results have been far short of expectations. The question is, Can more be done?

Perhaps without general knowledge on the part of the public, leaders have been directing their efforts to another angle of the question, that is, personal hygiene, in a more or less systematic manner for the last 20 years, begun with school children, then taken up by lodges, insurance companies, leading industries, civic associations, etc. We now believe we are on the right road to very certain and more marked reductions in the prevalence of sickness and premature death. In fact we already see about us more marked improvement in death rates and sickness rates undoubtedly due to better personal hygiene. Efforts have been aimed at tuberculosis with great emphasis and with remarkable

results, although perhaps all the gains cannot be credited to man's efforts alone. One British investigator declares that at the rate tuberculosis is now decreasing and has been decreasing in England during the last half century, it will become a rare disease there within 30 years. Equally as much can be said for America.

Evidently, combining all these efforts we are on the right path, but it is necessary that we increase our attention to personal hygiene as a most powerful weapon in the battle against sickness.

As far back as 200 A.D. the physician Galen declared there was a certain "aptitude" on the part of some persons to get sick and others to stay well. He noted that not all got sunstroke who were exposed to the hot sun. Not all died when a pestilence was at hand. He thought the position of the dog star might have much to do with it, and other equally foolish notions, but the full significance of Galen's remark about "aptitude" is probably not yet fully recognized. This "aptitude" or liability to disease, this lowering of resistance or loss of immunity, constitutes the fundamental reason for giving attention to personal hygiene, which, as stated above, is the third phase in the scientific development of a sturdier human race and the triumph over vegetable and animal enemies, and other natural and artificial hazards.

Even today we are entering well into a fourth phase, the era of immunization, in which, in addition to increasing bodily resistance by all the means just recited, we shall resort to "specific" or special kinds of immunizations for practically all diseases, by means of certain vaccines, serums, drugs, exposures to light waves of certain known curing powers, etc. But it is not likely that we shall ever find it permissible to relax our vigilance in respect to sanitary engineering, disinfection, and isolation (although quarantine may be greatly modified if not abandoned), and personal hygiene.

Because of the newness of the subject of health as a scientific study, we have less facts to go upon than we desire and much less than we shall have within the space of the next generation. Consequently, much that we read and proclaim upon this subject today is still on the basis of faith. This faith, of course, is based upon more or less scientific observations made largely in the experimental laboratory, or it is based upon broad statistics, and, because some see things differently from others even when viewing the same circumstances, there occur honest differences

of opinion where it comes to applying known facts or observations. In such a situation the reader is forced to accept much because of his faith in the proclaimer or instructor. With this explanation then, the writer will proceed to give his views upon personal hygiene and the effects of one's contact with the outside world, and to arrange his explanations in as orderly a manner as possible.

A logical method of proceeding is to consider the proper hygiene or upkeep of the body in its different organs or parts, called "systems," and at the same time to discuss the chief enemies and menaces or hazards which affect these parts.

The human body is customarily divided for purposes of study into the following systems: (1) the digestive system; (2) the skin, hair, and nails; (3) the breathing or respiratory system; (4) the blood, heart, and circulatory system; (5) the kidneys, bladder, and sexual organs; (6) the muscles, bones, and joints; (7) the nervous and mental system; (8) the eyes, ears, and special senses; (9) the glands of internal secretion.

Each of these systems is composed of a number of organs or parts, and for each organ or part it is very desirable to know a number of important things. This desired information is covered in the following outline.

1. Some knowledge of the structure and perhaps manner of growth, even before birth, of the organ or part (anatomy and embryology).

2. The purposes or functions of the part (physiology).

3. The "toleration limits" or what strain it may stand and yet remain in health (hygiene).

4. The "adaptation limits (acclimatization)" or what exercise and "hardening" may permit in extending the toleration limits (hygiene).

5. The effects of habit, especially those damaging the parts (hygiene).

6. The examination of the organ or part (physical diagnosis).

7. The signs or standard tests of healthy or "normal" conditions (physiology and hygiene).

8. The "earmarks" of abnormal conditions (hygiene and pathology).

9. The common diseases and afflictions which affect the part (pathology, medicine, and surgery).

10. "Prophylaxis," or the prevention of disease. This may occur in three phases: (*a*) prevention before the disease has

begun, (*b*) stopping the disease which has once started, and (*c*) preventing complications or relapses from taking place as well as the spread of the disease to other organs or parts, and to other persons.

11. First aid, especially as regards emergencies.

It will not be possible to follow out this outline to completeness in a book of this size; so the author has selected those features which appear to him the most important for discussion in the chapters to follow.

Summary.—Personal conduct is today believed to be the chief of the three advances, sanitation, bacteriology, and hygiene, under which we are proceeding. We are made acquainted with the logical method of analyzing personal hygiene and of the position of this subject between health (anatomy and physiology) on the one hand and disease or mishap (pathology) on the other hand. The chapters which follow develop the outline given in this chapter.

CHAPTER V

THE DIGESTIVE SYSTEM

Food fed to man passes along a 30-foot tube which some call a 30-foot culture tube because it is alive with bacteria from one end to the other. From the mouth it passes down the esophagus about 16 inches to the stomach which gradually enlarges to include a whole meal. After a stay from 1 to 5 hours here, it enters the small intestine along which it passes for a distance of about 20 feet where it is mixed with bile from the liver and gall bladder, and juices from the pancreas and other glands. Here much of it is absorbed into the body by means of the rich supply of blood vessels and lymphatic channels. What remains passes into the large bowel, or colon, entering this at the lower right side of the abdominal cavity; also the appendix is attached here.

The large bowel is from 6 to 8 feet long. It carries the food, now mostly water and refuse, up past the liver and across below the stomach to the deep left side. It then passes downward, twists once or twice in the lower left side of the abdomen and pelvis, its contents getting more and more solid all the time, until what is left goes into the rectum where it is stored until one goes to stool.

A given meal takes from 12 to 48 hours to make the run. The whole process is automatic except the eating and the obeying the call to go to stool about once a day. However, many things which we do and don't do interfere with the "machinery" and its automatic action.

THE MOUTH

The uses of the mouth are at least a dozen in number, yet we rarely think of more than two or three. It is the receiving department for all that goes into the body except air, and it is also used for that purpose very often. The biting off and chewing of food, mixing it with saliva, tasting, and perhaps spitting out of certain things which do not please us, are uses known to all. Possibly a little digestion may start in the mouth in the case of

starchy foods. Usually the saliva starts the digestion of the starch in the food, which then continues for 15 to 20 minutes in the "bolus" or lump of food after it is swallowed and lies in the stomach. When food is put into the mouth, a nervous connection is made with the stomach which begins to pour out the proper digestive fluids for the food which is expected to arrive soon. From the mouth we spit out, sneeze out, and cough out much waste material which may come from the nose, inner tubes of the ears, the lungs, and even the stomach.

Movements of the jaws affect the ear canals, giving them exercise and moving the wax along in the outer canals and the

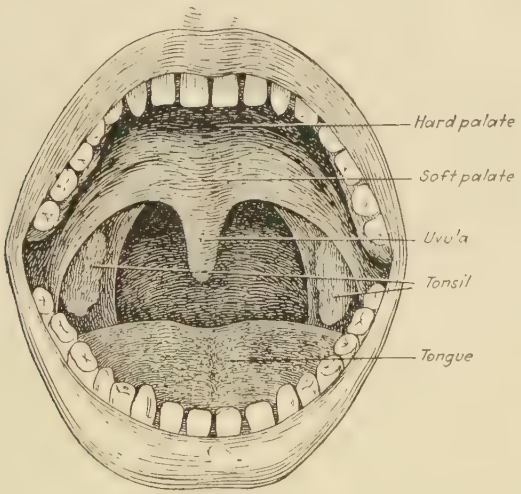


FIG. 9.—The parts of the mouth.

secretions along in the inner tubes which lead from the ears to the throat (the Eustachian tubes).

The mouth regulates the temperature, to a large extent, of cold or hot things which we eat. It stores food for a few moments while we are biting off more. It has much to do with "amplifying" the voice.

It is probable that some amount of disinfection or killing of harmful germs takes place in the mouth due to the poisonous properties of the saliva (which properties are, however, weak). On the other hand, the mouth and throat are veritable storehouses of germs, usually harmless, and this may be Nature's

arrangement by which our tonsils and mucous glands manufacture vaccines which protect us against these very same germs, should they become dangerous or succeed in getting into the body tissues.

Ordinarily the mouth stays well. It is very resistant or much hardened to infections so that in spite of the presence of its many germs, wounds and cuts about the mouth heal up readily if one is in good health. But an exception should be made in the case of the teeth, which will be discussed below. The mouth is also quite proof against poisons so that if a poison gets no farther than the mouth, it will usually do no damage to the body because it can rarely be absorbed from the mouth. Oftentimes the gums may serve as teeth for old people and are much to be preferred to bad teeth.

Bad Habits.—Among common and dangerous habits which cause many diseases is that of putting the fingers to the mouth and of holding things in the mouth. This is especially so when the fingers or other objects (pencils, street car transfers, etc.) are still moist from the imprint of the other fellow's fingers or when the articles have been in others' mouths or may have been soiled otherwise. To get an idea of how quickly the fingers spread anything which is on them, rub some of the peel of fresh red peppers on them and then wait. Presently the lips, nose, eyes, and perhaps other parts will begin to smart or sting, showing they have been handled. Hence, one should always wash the hands and dry them before eating.

A common bad habit is undoubtedly that of eating too fast, although the writer believes the dangers from this are overstressed in many books on hygiene. A person may find this out for himself, in case he suffers from dyspepsia, by taking two or three times as long to chew each mouthful. If the dyspepsia disappears, then he may properly guess that he has been eating too rapidly; on the other hand, I think the majority of people are much like lower animals and eat rapidly as a natural habit without any evidence of ill health from it. It is probably much more important to watch what you eat than how you eat it. I am sure, also, that our custom of eating three times a day is purely a convenience rather than a necessity. It fits in best with the rest of the daily program, but there are many races of people in the world who eat almost whenever they can get it and do not appear to be any less healthy on that account.

The question whether one should drink water at meal times or only between meals is not important. Drink when you are thirsty, but avoid "washing down" your food with a drink every few mouthfuls; also note that you will chew things better if you eat them dry and thus may help to cure dyspepsia. It is probable that eating things too hot or too cold, especially if one eats and swallows rapidly, does more damage to the stomach than most persons think. Nature ordinarily does not supply us with hot and cold foods and drinks. This "improvement" is man's idea. There is no doubt that much of our present-day food is too soft for the welfare of our teeth, which are given us to bite and chew with. As a rule we do not eat enough juicy fruits and fresh vegetables; these juices help to keep the teeth clean and thus should be eaten at the end of the meal.

Examination of the Mouth.—The teeth are of great importance and I think each one should know how to examine them and the mouth and throat, at least in a superficial way. By simply looking into, or inspecting the mouth, we can see whether the teeth are discolored, broken off, or absent. By feeling with the tongue, we can find whether they are smooth or seem coated with a layer of "tartar" and perhaps old food. This "tooth sense" is natural to animals and savages, but we have lost if for the most part. Our teeth should feel smooth. If not, they should be cleaned up with a tooth brush and perhaps dental paste. The dentist finds out much more about your teeth after cleaning them and by the aid of small mirrors, the X-ray, and other means. A simple flat wooden stick or spatula, or even a teaspoon, will greatly aid you in holding the lips and cheeks to one side while examining the mouth, the cheeks, and the teeth.

What do we consider a normal, healthy mouth? There are several "high signs." The lips should be pink in color. The lining of the mouth should be even colored throughout, especially in the back part. The tongue may show a little coating but it is better if it is clean looking; also it should not look large, swollen, or pale, with the marks of the teeth showing along its edges when it is stuck out of the mouth.

The teeth should be 32 in number in the adult although the last teeth on each jaw may not appear until a person is close to 25 years of age. Have you all of yours? There are 16 above and 16 below, if all are present. They should be lined up "straight," as we say, or, in other words, they should not be

crooked. They should be milk white in color. If they are colored, one should consult a dentist to find out if any disease of the teeth or constitution is present. When the jaws are shut, the teeth should come together correctly, the front ones above overlapping those below; otherwise one cannot bite or chew correctly. The edges of the gums should be closely fastened to the teeth and should have practically the same light pink color as the lining of the mouth.

The soft palate, which can be seen hanging down from the roof in the rear of the mouth when the tongue is pressed down, should not be redder in color than the lining of the mouth. One should also learn to know its appearance while feeling well in order to judge whether it is swollen or too red when ill. Needless to say there should be no trembling, palsy, or paralysis of the lips, tongue, and jaws.

Finally, there should be no odor of the breath. It may be necessary to ask someone else to judge of this for you. A bad breath may be due to several things, but one of the commonest reasons is bad or "rotten" teeth. As a bad breath is disgusting, tending to make others avoid you at least in a personal way, one can see the necessity for having this condition investigated if it is present all the time. No doubt bad breaths prevent many love affairs.

There also are definite ways of knowing when there is real trouble in the mouth. The lips may be pale, too red, or even blue, or cracked and sore. Other signs are pyorrhea or diseased and reddened gums, gums which are pulled back from one or more teeth; a coated and perhaps enlarged tongue; bad or crooked teeth; sores on the gums, tongue, or lining of the cheeks and lips; a high-arched palate which often means long-standing nose trouble or adenoids; and, especially, any reddening or swelling of the soft palate, tonsils, or throat. Any of these abnormal signs call for attention. Many times they are present before any other evidence of sickness is present. One should at least satisfy himself that any of these abnormal signs, if continued, is without significance by consulting his physician and perhaps his dentist.

The commonest diseases of the mouth are those of the teeth, the palate, and the gums. Also a number of "catching" diseases show early signs in the mouth, such as measles, scarlet fever, diphtheria, syphilis, and mumps. Other afflictions of the mouth

which demand early attention are swellings about the jaws, in the gums or cheeks, and also ulcers or sores which last more than a week or so. Such swellings or sores may be the beginning of cancer, or of chronic infections of grave significance.

The general health of the mouth can be improved by a free action of the tongue and lips to keep the teeth smooth and clean. This is the method used by lower animals and also by many human beings who have beautiful teeth, but whose tongue and lip movements in keeping them so are not considered a credit in "polite society." If you belong to polite society, you will probably have to substitute the toothbrush and paste for Nature's original method. Vigorous use of the jaws in chewing, hard substances to bite upon for at least some part of each meal, and care in taking your food and drink—not too hot nor too cold—are important to maintain a healthy mouth. Don't forget that the juices of fresh fruit help very much to clean the teeth and tongue.

The teeth are of great importance in the human body. The parents should observe whether teeth have begun to appear in a baby by the ninth month of its age. Otherwise medical authority should be consulted. When the child is about 5½ to 6 years of age, a most important tooth appears which is usually overlooked. It is the "sixth-year molar" which appears behind the last baby tooth. It is a weak tooth in civilized man; that is, it tends to decay very quickly. It is, however, a permanent tooth, the first one to come through and should be looked for and kept from going "bad" before it is too late. Teeth when broken off are not apt to become "rotten" as most persons imagine. Usually a new enamel like-layer forms upon them. "Rotten" teeth are due to improper food and the collecting of starchy foods (bread, potatoes, pastries) and sweets about the teeth where germs (bacteria) produce acids which dissolve the enamel of the teeth and start black spots. The true prevention of this consists first in keeping the teeth smooth and clean, and cutting down the amount of candy, sweet things, soft breads, etc. so commonly indulged in. Teeth will also soon loosen or decay if the gums are diseased or become separated from the roots of the teeth. A tooth which is not used because its corresponding tooth in the other jaw has been pulled out will usually loosen or decay in time. The teeth obey the same laws as other parts of the body. If not used, they soon weaken and decay.

Tobacco is not injurious to the teeth, as a rule, nor is it in any sense antiseptic, because germs will live in tobacco juice, which apparently has no effect upon them. To a certain extent chewing gum or tobacco helps the exercise of the jaws and the health of the teeth. The main serious effect of tobacco is that its juices are swallowed or absorbed into the body, when tobacco is chewed or smoked. I know of no good evidence that the salivary glands suffer from overwork in chewers, but I am convinced that many chewers of tobacco and sometimes of highly spiced barks, etc. suffer from indigestion because of the more or less constant stream of irritating juice which finds its way down the throat to the stomach. "Good teeth, good health" is a saying which is more or less true. At least good health is usually associated with good teeth.

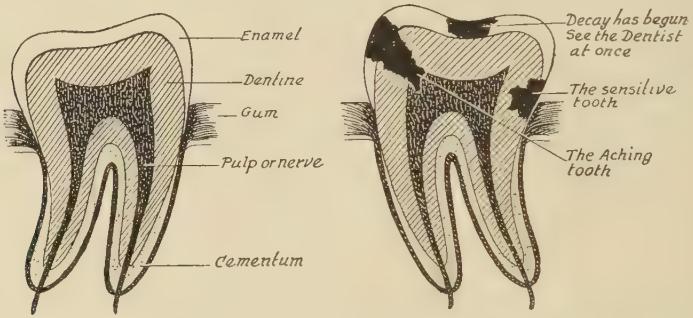


FIG. 10.—A cross-section showing a healthy tooth (left) and the usual forms of decay which occur in a diseased tooth (right). (*Courtesy National Safety Council*, with modifications.)

Signs of Bad Teeth.—Some of the signs of bad teeth have been indicated. I would emphasize that toothache is always too late a sign of tooth trouble. Teeth should never be allowed to go until they ache or pain before attention is given them. Many a headache also is due to bad teeth. Any neuralgia, earache, pain in the eyes, or in the neck should call for an investigation of the teeth. Pyorrhea, sore gums, "matter" (pus) between the gums and teeth or swellings about the teeth or jaws should be taken care of today and not "let go until tomorrow." Even stiff joints, rheumatism, lumbago, sciatica, wry neck, and any stiffness or limiting of movement in any part of the body should call for an examination of the teeth. All "snags," roots of broken-off teeth, decayed spots, blackened areas beneath crowns, all loose teeth, and places without teeth should be taken care of by a first-class dentist. Some-

times goiter appears to be due to bad teeth. The infections which get into the body through the teeth may even cause heart disease. Cancer of the tongue or lips or cheeks may follow the constant irritation of a ragged tooth or "snag." Impacted or "wedged-in" wisdom teeth often occur and sometimes other teeth lie horizontally or sideways, and the cause is unexplainable. They may cause a great amount of headache or neuralgia and are difficult to discover until one counts the number of teeth present to see whether all have been removed, or until the X-ray shows the impacted tooth buried in the gum.

FIG. 11.—A bad condition of teeth and gums is a common sight.

Abscesses.—One of the commonest and most serious tooth diseases is the location of a blind abscess or pus pocket at the root or roots of a tooth. Many times such teeth look perfectly normal at the top and may have no feeling of pain about them. Most of the symptoms of teeth with pus pockets are constitutional, that is, spread through the body, and are due to poisons (called "toxins") absorbed into the system from the growth of germs located in the "pocket." The diseases and health troubles due to these pus pockets are regarded as many, such as abscess, weakness, rheumatism, heart disease, nervousness, excitement, poor memory, and, some doctors think, even insanity.

In general, a run-down condition or feeling of "knock out," or dislike of work, several times each month, or one or two days

a week, calls for a careful examination of the teeth, as well as the tonsils, for these pus pockets. It is a good rule in all puzzling cases of chronic illness to have the teeth X-rayed and to remove at once teeth found with pus pockets, whether they appear healthy on the surface or not. This is particularly true of teeth that have once been crowned. It is much better to have no teeth at all and to use the gums for chewing than to permit these "blind" abscesses or pus pockets to remain.

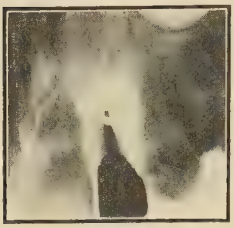


Fig. 12.—An X-ray picture which shows a crowned tooth. The root of this tooth is surrounded by a pus pocket (shown in white). The other teeth are healthy.

The teeth are likewise damaged by certain poisons absorbed into the system, chief of which are lead, mercury, and phosphorus. Usually the gums are discolored and diseased, and are more affected than the teeth, at least at first. A black line on the edge of the gum next to the teeth is quite characteristic of lead poisoning.

Bites.—The effect of bites is something which requires prompt attention. From animals, especially dogs, we fear mad-dog bite (hydrophobia or rabies), which requires Pasteur treatment. From bites from human teeth come several kinds of infections which may be difficult to overcome. Occasionally syphilis may be caught in this way. If you must hit a person with your fist, don't hit him in the teeth. You will likely receive more damage than he. In case of bites by human teeth, dogs, other animals, or snakes, the quickest first-aid remedy is to suck the part bitten, of course, spitting out the blood, etc. Also gently squeeze the part to encourage bleeding from the wound. Get medical aid as soon as possible. If the bite is on the hand or arm, you can stop the seepage of poison into the system by tying something around the arm below the shoulder, not too tightly but enough to stop the pulse at the wrist. Anything tighter than this may do serious damage to the arm. If bitten on the foot or leg, tie something around the leg above the knee. If aid cannot be gotten within an hour, one may drop nitric acid (one to two drops) into the wound. Tincture of iodine alternated with hydrogen peroxide are fairly efficient germ destroyers. I say "fairly efficient" because they may not get down into the wound to its bottom, but wherever they touch they are effective.

The teeth not only cause disease and ill health, but are themselves affected by disease and ill health elsewhere in the body, such as partial starvation from disease or bad feeding, also rickets, and scurvy which are very common in babies and children in many of our cities. The teeth are affected by adenoid growths in the nose which cause a suction pressure that pulls up the roof of the mouth, causing a high-arched palate and thereby affecting the teeth. Syphilis in parents greatly predisposes to bad teeth in children.

Care of the teeth may be summed up as follows:

1. For a child, have the teeth examined by a dentist at least every six months. A child between 5½ and 8 years of age should have its teeth examined every 3 months and sometimes oftener, especially if they seem to be decaying rapidly. Once a year will usually suffice for an adult.

2. The baby teeth should never be allowed to decay; they should be kept filled or looked after by the dentist until they fall off from the gums when the second set of teeth push them out, or until it is necessary to have the dentist pull them out. It is a grave mistake to allow children's teeth to rot out; almost invariably some of the second teeth will be caught in the decay and perhaps ruined.

3. Inspect your teeth weekly and have any small black spots or other suspicious places attended to.

4. Keep your teeth feeling smooth; judge this by running your tongue over them. Use the toothbrush, wooden toothpicks, tooth paste, and perhaps dental floss. Never go to bed without cleaning the teeth. Never allow food, such as meat, etc. which gets between certain teeth, to stay there. Tooth damage is done by germs when you are asleep much more than when you are awake, since, when awake, your tongue and cheek movements help to keep them clean.

5. Attend promptly to disease of the gums.

6. Eat some hard or coarse food every day for the sake of hardening the gums and the teeth. Milk, whole-wheat foods, eggs, sweetbreads, and green vegetables, since they contain vitamine D, are the types of foods to eat to prevent decay of the teeth.

7. Cut down or stop the use of candy, preserves, and other sweets unless you eat something else afterwards, or unless you eat them during the mealtime and expect to clean the teeth

afterwards. Candy, just before bedtime, is bad for the teeth unless you clean them and the mouth before "turning in."

THE THROAT

The Tonsils.—The chief place of disease in the throat is in the tonsils. Tonsil trouble begins in childhood, often starting as early as 2 to 3 years of age. The tonsils are natural organs and have a purpose; probably it is to make vaccines for us against diseases. They are located on each side of the throat and often correspond to lumps which may be felt in the neck just below the jaw on each side. Children also have a third tonsil in the back of the throat, high up, called "adenoids." The tonsils and adenoids in civilized people seem to get diseased very easily. Perhaps it is because we stay in the house too much, or eat too much sugar and candy. These structures grow gradually larger until a child is about 8 years old. Then they should begin to get smaller and, finally, should all be gone, or absorbed away, when a child is about 14 years old. When tonsils still show, that is, are enlarged after 14 years of age, they are usually permanently diseased and useless and should be removed if one has attacks of tonsillitis. Their removal during childhood (up to 14 years of age) is more questionable, in the author's opinion, and the careful physician should be left to decide.

We know there are always germs in the mouth and we ought to be used to them, that is, "immune" to them, but many times we are not and these germs "rear up" and cause lots of trouble, both in the tonsils and adenoids. Germs make pus pockets in the tonsils or adenoids, and the foul material is absorbed into the system. The child who keeps getting colds in the head usually has adenoid trouble. Bad ventilation in the home at night, sleeping in a warm room, getting the feet wet and cold, or sitting in a draft all are apt to cause tonsillitis and, in children, adenoid trouble.

A bad form of sore throat and tonsillitis comes from milk from a cow with a sore udder, often causing an epidemic all along a milk route. Pasteurizing the milk would prevent this.[1] Also keep

[1] The possible connection between a small sore or ulcer on the udder of a cow a hundred miles or more in the country and an epidemic of very severe sore throat in a neighborhood is now well known. The germs from this sore get into the milk. The milk is mixed with that from other cows and if used raw, *i.e.*, without being pasteurized, many persons may develop severe tonsillitis and sore throat. Infections of this kind may result in death. Hence it is to everyone's interest to enforce milk ordinances for the procuring of safe milk.

away from a person with a sore throat. Keep the child with a sore throat in a room by itself. Many times persons catch sore throats from one another just like measles or scarlet fever. The person with sore throat should eat from separate dishes which are boiled before being returned to the cupboard.

Many people have a slight sore throat a good deal of the time, for which they use cough drops, gargles, etc. Horehound candy would be as good. Since becoming civilized we have lost our "throat sense" and pay no attention to slight sore throat. Occasionally it gets worse and a genuine sore throat is noticed, or a tonsillitis starts, sometimes "quinsy sore throat," etc. As in the case of bad teeth, the person who feels run down and notices that his throat doesn't feel right should look at his tonsils and do it quickly, for they get very bad, many times, if let go 3 or 4 hours.

Examination of the Tonsils.—To examine your own tonsils, stand in front of a glass or take a hand mirror; don't put out your tongue; leave it lying flat in the mouth; make your throat go as if you were going to say "Ah." By gulping, you can make the opening into the throat look still larger. Bad tonsils show as redness at the sides of the throat and back of the mouth, with usually some swelling of the tonsils themselves. If you press the tonsils at the bottom above the side of the tongue, whitish plugs will often be squeezed out, which smell very foul. Sometimes there is a soreness, or even a swelling on the outside beneath the angle of the jaw; this is not the tonsil but is called "swollen glands." These glands drain the tonsil and will swell up if the tonsils are bad. In children, always have a fear of diphtheria when sore throat is present. In fact it is better to call a doctor for every case of sore throat in a child.

Besides the throat trouble, a grown person will notice that he has a headache, sour stomach, no ambition, and loss of "pep." Sometimes his throat feels sore in swallowing, but he should not wait for this. If he waits until his throat feels sore, it is usually too late to do much to stop it, just like waiting for a toothache before going to a dentist. It's a "Bill-put-it-off" policy that costs lots more in the end.

Treatment.—To stop a sore throat, get busy at once. If you are away from home or "on the job," keep clearing your throat, or "hemming" and making it go up and down. Better still, gargle with a drink of hot water. Do it several times. If you can, add some salt to the water. Never drink cold water or eat

ice cream with a sore throat just coming on. Better still, get some tincture of iodine at the drug store; every family should keep a 2-ounce bottle of this on hand. It has so many uses and I shall often recommend it throughout this book. Also buy a small package of absorbent cotton and a little box of round wooden sticks called wooden "applicators"—they cost about 60 cents a thousand by the box—for use in making swabs for throat trouble and for all kinds of cuts and bruises, etc. Mix the tincture of iodine with the same amount of water, or glycerin, as it is a little too strong for most people to use it straight. (Never dilute tincture of iodine in a silver spoon or other metal receptable; use a glass bottle or a chinaware cup. To remove iodine stains, use alcohol; also sunlight will cause them to disappear.) Never use this tincture as a gargle; it is too strong. Just twist a little cotton on one of the wooden sticks—twist it tight, not loose—dip it into the bottle of diluted iodine, press against neck of bottle so that there is no dripping, and then rub or "swab" it on, first on one tonsil and then the other, after which throw the stick away in a safe place where children won't get hold of it (for fear of spreading disease). Always use a new stick for a second person. Results: within 5 minutes you will "feel like a new man"; new life comes into you. Now take a mild physic. Keep your feet warm and you can go about your business. But if you haven't done this within the first 4 to 6 hours of the trouble, you won't get such good results.

If you have a chill or "ague," or shiver and shake, and your throat looks and feels sore, treat the throat the same way. Take some baking soda in hot water, say a third of a teaspoonful; also take a physic at once,[1] and plenty of hot water or hot lemonade. Soak your feet in hot water and then go to bed. If it seems to get worse, call a doctor. These sore throats, although they may happen only once a year, usually in the fall or winter,

[1] Take 5 to 10 tablets of one-tenth grain calomel, one every few minutes, followed 10 to 12 hours later by a teaspoonful of Epsom salts dissolved in half a glass of water. This is a very reliable physic and usually not painful or griping, especially if the calomel is the usual tablet made up with baking soda (bicarbonate of soda), or if baking soda is taken at the same time as the tablets. Calomel with baking soda in the form of tablets, wintergreen flavored, can be purchased in bottles of 100 each at drug stores, usually not costing over 35 cents per bottle. Likewise, one should keep in the house from several ounces to a pound of Epsom salts (called also bitter salts, or magnesium sulphate crystals), which are cheap.

are often due to pus pockets in the tonsils and a person should have the tonsils removed, especially if he has any of the troubles due to pus pockets (see pp. 41, 138). Bad tonsils and attacks of tonsillitis often cause heart disease, rheumatic fever, lumbago, stiff neck, etc.; in fact, a list of diseases "a mile long" has been laid to bad tonsils and bad teeth.

The smoking habit reddens the throat and often makes it feel sore or "burn." This leads to a desire for something hot or stimulating like alcohol. Hence smoking may encourage "boozing." Sometimes a small blood vessel, swollen by smoking, bursts through and, while not serious, causes one to spit blood and become very much scared. Smoking is not a substitute for the alcohol or whisky habit; in fact, smoking may create a desire to return to the alcoholic drinks if one has ever had the habit.

THE STOMACH

Location and Parts.—The stomach when in normal position lies in the upper part of the abdominal cavity. It is nearly vertical in position when empty, but when filled it is more horizontal, with the entrance to the left of the middle line and deeply located, and the outlet, or pyloric end, toward the edge of the ribs on the right side. The left and bottom of the stomach, called the fundus, are the parts which fill out the most when one eats. The right and upper portion is short and more fixed in position. The stomach is a thin organ with muscles in its walls and lined with a mucous membrane which secretes digestive juices and hydrochloric acid. When apparently empty, it still contains a few teaspoonfuls of fluid, usually of a bland, water-like character. The stomach is capable of performing its functions fairly well even when pulled or forced out of position and lying at various places in the abdominal cavity.

Purposes.—The functions, or purposes, of the stomach are several. It is a storage place for liquids and food. In this it has more or less selective action. Water, for instance, is held for a few minutes only, although cold water stays longer, apparently until its temperature is about that of the stomach. Food usually arrives in the stomach in the shape of swallowed masses, each called a bolus, surrounded with layers of mucus to protect it from the stomach juices and to permit some salivary digestion to take place within the bolus for upwards of 20 minutes or so

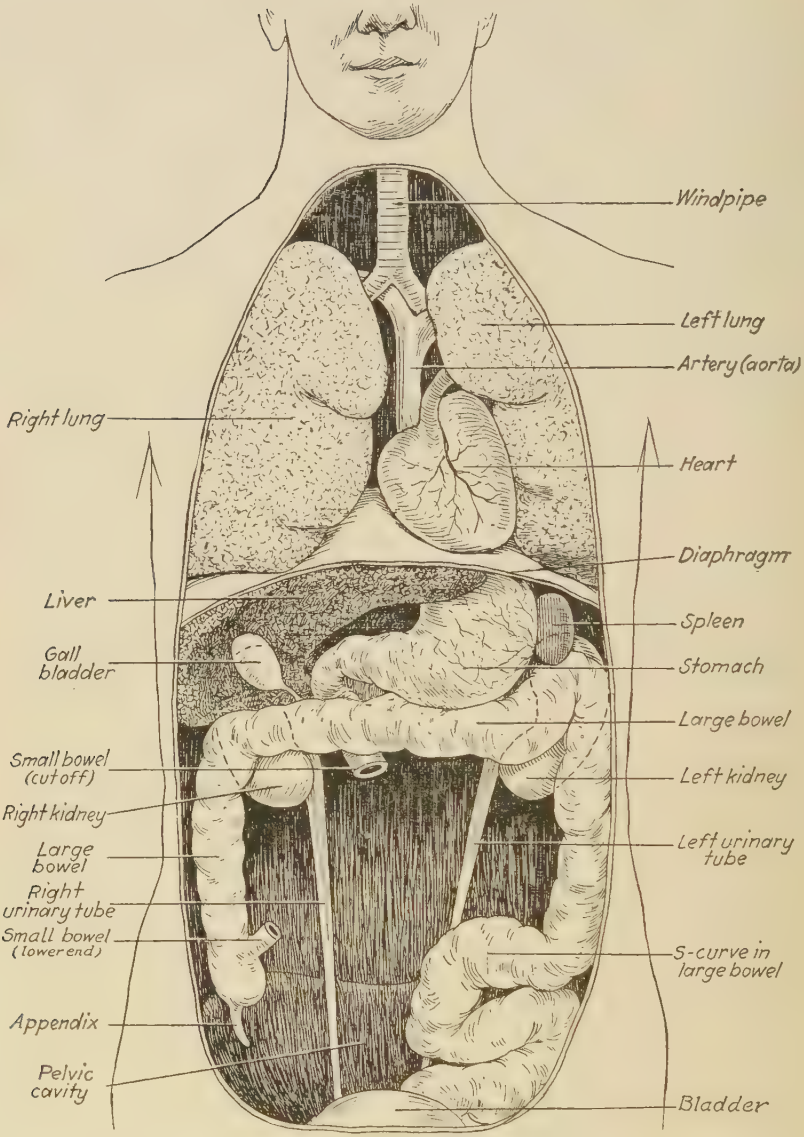


FIG. 13.—The chief organs of the body.

after it reaches the stomach. These food masses gradually collect in the upper part of the stomach and increase the size of the organ to the left and downwards as one continues his meal. Bread, cereals, and other starchy foods, after being partly digested, are the first foods to be forced on by muscular straining action towards the pylorus or outlet of the stomach, and to leave it, usually 1 to 2 hours after eating. Meat, eggs, and other protein foods remain 3 to 5 hours, during which time they are partly digested by the hydrochloric acid and digestive juices. Butter, oils, and fatty foods remain from 3 to 6 hours and finally follow the rest through the pyloric opening into the first part of the small intestines, called the duodenum.

When one eats, the secretion of digestive juices is started at once in the stomach, being aroused by the odor and taste of food while it is still in the mouth (psychical secretion). The juices gradually take on an acid character after the food arrives in the stomach. Different digestive juices are added, each apparently according to the nature of the food eaten (chemical secretion). More hydrochloric acid is produced with a meat or protein meal. This acid may increase to as high as one-half of 1 per cent, but digestion is thought to be best when the acid is not over two-tenths of 1 per cent in strength. Percentages above this occur in hyperacidity (see p. 65). The digestive power of the juices gradually reaches its maximum between the second and third hours. All during digestion the contents keep passing into the duodenum in spurts every few moments, while regurgitation from the duodenum, containing bile, also takes place into the pyloric end of the stomach. Only liquids and food digested to the consistency of a bean soup, called chyme, are allowed to pass on out of the stomach, at least until the meal is quite completely digested. Larger particles are held back and returned for further digestion. At the end of digestion, undigested substances such as seeds and foreign bodies, even as large as a small marble or peach seed, are then allowed to pass on into the duodenum. An upset of this orderly procedure of digestion is the chief cause of dyspepsia or indigestion, different features of which are discussed on pages 64 to 68.

It will thus be seen that during the digestion of a meal the stomach acts as a mixer, disintegrator, and strainer, assisted by chemical action. At the same time the warm blood in the walls of the stomach brings cold or hot foods or liquids to an even tem-

perature, that is, to about 100°F. As the hydrochloric acid is poured out, the secretions become germicidal in nature and so destroy germ life. Thus the stomach itself may be preserved with its contents for months after death if it contains partially digested food. This is a protective measure against the swallowing of dangerous germs such as those of typhoid fever, cholera, and dysentery, but when the stomach contains no acid, as between meals, this protection is gone.

A limited amount of absorption of water, salts, sugar solutions, and peptone solutions may take place from the stomach walls into the blood vessels and thus into the body, but this is not enough to support life; in fact, such usually occurs under forced conditions only. Alcohol and some drugs are more readily absorbed than are foods. Thus it can be seen that the stomach is more of a storage place and a starter of digestion than an organ to nourish the body. Nourishment, or absorption of food substances, takes place mostly from the intestines.

The stomach may also remove poisons from the blood, and, as is known, in the process of vomiting it will throw out poisons, bile, partially digested foods, and objectionable contents. The stomach may be easily injured by things swallowed, since it has a temporary lack of sensitiveness to hot and cold things, and to many poisonous and injurious agents. It is likewise subject to great distension without bursting, but such may damage it severely. While a very important organ, the stomach is not absolutely necessary for life and occasionally has been almost entirely removed without causing death. Naturally, one whose stomach is gone would have to eat much more often and change the nature of his diet.

The stomach is also capable of great thickening of its muscular walls, as when some obstruction occurs at the pylorus or emptying end. Such obstruction may be due to an ulcer, a spasm of the sphincter muscles at the pylorus, a cancer, or disease in the gall bladder or neighboring parts. Various signs of obstruction are then noticeable, such as the stagnation of the stomach contents and the vomiting of foods eaten several meals previously. Also the appetite is not satisfied after eating. An opening to short-circuit the food may be made by the surgeon between the stomach and a portion of the intestine (gastro-enterostomy) and thus permit the organ to rest, as when there is an ulcer, cancer, or other disease present.

To determine disease of the stomach the physician resorts to many methds, such as test meals, the X-ray, the fluoroscope, the gastroscope, the stomach tube to suck out some of its contents for laboratory analysis, and even an operation to look into the stomach for better inspection. Most of these methods are simple and enable the physician or surgeon to find out and correct many of the disturbances from which the organ suffers.

The most important thing about the stomach is what goes into it. This means food, drink, and sometimes drugs and poisons. The poisons may come from one's work. You should make it your business to know the poisons used in the line of work which you follow and how to keep from being poisoned with them. In the various trades the unions should help in this important matter. Usually your state department of health can help you, or tell you to whom to write. It is what goes into your stomach that matters very much more than irregular eating or eating too fast, or even eating too much, although all of these require some common-sense regulations. The northern Mongolian soldiers are fine specimens of human beings. They eat when they can get it, usually not more than once a day, but they are careful to select a wide range of food. They are also very active. They "lay up" a couple of hours after eating one of their big meals. Our civilized customs do not permit this and, from the way we divide our work day, it is best to eat three times a day—breakfast and lunch lighter than supper, when we can usually rest afterwards for an hour or so.

In many respects we have lost our "eating sense." It often has no relation to our bodily needs. I observe that when I am working the hardest, I eat the least and also crave the simplest of things. Some people would say I am on a diet, but it is a diet for work and for good health. It is when I am loafing or taking it easy that I eat too much and too richly. On the other hand, a "full" meal stops the desire to work. No doubt it is the extra amount we eat which we do not need that causes much trouble. If we take care to eat sparingly of simple things and to eat slowly, then only may we still "follow the appetite" —Nature's guide—for *when* and *how much* to eat. But for civilized man the appetite is not a safe rule for *what* to eat. This is because we tamper with our food too much in order to make it appetizing or attractive, or to keep it from spoiling from one day's end to another, etc. Since the discovery of fire, we

have undoubtedly eaten too many warm meals. I think there is no evidence that cold meals ever harmed one's health.

Foods are cooked to make them more digestible and palatable, but cooking is apt to make them more stimulating to the appetite so that cooked foods invite eating to excess. "The appetite which comes with eating comes with cooked foods alone." Dairy products, salads, fruits and leafy vegetables are not particularly stimulating, so that we do not tend to overindulge in these simple foods.

Our food manufacturers and we ourselves do not select food widely enough; we cut away and throw away parts of our food, like the inner skins on vegetables and fruits and the hull and germ portions of grains, which contain vitamines, salts, and roughage —all quite necessary for our very existence. Children cease to grow correctly without them. It has recently been shown that wheat germ, yeast, and cereal hulls contain a substance, perhaps a vitamine, which prevents constipation. Our present views of the vitamines may be summarized as in Table 1:

TABLE 1.—PRESENT VIEWS REGARDING VITAMINES

Name	Character	Reliable sources	Remarks
Vitamine *A*	Fat soluble	Cod liver oil, butter, cream, egg yolk, sweetbreads, giblets, fresh green vegetables	Promotes growth and perhaps resistance
Vitamine *B*	Water soluble	Fresh vegetables, fruits, milk, egg yolk, yeast, grains, nuts	Prevents certain nervous diseases; also constipation
Vitamine *C*	Water soluble	Fresh juicy fruits and green leafy vegetables, milk	Prevents scurvy; ill health; sore gums
Vitamine *D*	Fat soluble	Same as *A*	Prevents rickets and tooth decay if calcium and phosphorus are also at hand. Appears to be closely associated with radiant energy of ultraviolet rays
Vitamine *E*	Fat soluble	Wheat germ oil, lettuce, etc.	Promotes reproduction (proved in rats) aids use of iron

TABLE 2.—VITAMINES IN FOODS

	"A"	"B"	"C"	"D"
Bread (water)	−	+	−	−
Bread (milk)	+	+	−	+
Bread, whole wheat (water)	+	++	−	−
Bread, whole wheat (milk)	++	++	?	+
Barley (whole)	+	++	−	
Corn, yellow	+	++	−	
Oats	+	++	−	−
Rye, cracked	+	++	?	
Wheat, kernel	++	+++	−	+
Wheat, bran	+	+++	−	
Liver	++	++	?	+
Kidney	++	++	+	+
Brains	+	++	?	+
Heart	+	+	+	+
Fish, fat	+	+	?	−
Fish, roe	+	++	?	+
Milk, fresh (unpasteurized)	+++	++	++V	++
Milk, condensed	+++	++	+V	+
Milk, evaporated	+++	++	?	
Milk, dried (whole)	+++	++	+V	
Milk, skimmed	+	+	+V	
Buttermilk	+	++	+V	
Cream	+++	++	+V	
Butter	+++	−	−	+
Cheese	++	++	−	
Eggs	+++	+	−	+
Almonds	+	++?	*	
Coconut	+	++	−	+
Hickory nuts	*	++	*	
Peanuts	+	++	*	
Walnuts	*	++	*	
Tomato (raw or canned)	++	+++	+++	
Beans, kidney	+	+++	*	
Beans, navy	+	+++	*	
Beans, string	++	++	+	
Beets	−	+	+	
Cabbage, raw	++	+++	+++	
Cabbage, canned	*	*	++	
Cabbage, cooked briefly	++	++	+	
Carrot, raw	++	+	+	
Carrot, cooked	++	+	+V	
Cauliflower	+	++	?	
Dandelion greens	++	++	+	+
Lettuce (garden)	++	++	+++	+
Onions	?	++	++	
Parsnip	−	++	?	
Peas, fresh	++	++	+++	+
Potato (boiled)	+	++	++	
Sweet potato	++	+	?	
Rutabaga	−	++	+++	
Spinach, fresh	+++	+++	+++	
Spinach, canned	+++	+	+++	
Squash	++	?	?	
Turnips	−	++	+++	
Apples	+	++	++	
Bananas	?	+	+	
Grape juice	?	+	+	−
Grapefruit	?	++	++	−
Lemon juice	−	++	+++	
Orange juice	+	++	+++	
Pineapple (raw or canned)	++	++	+++	
Raspberries (raw or canned)	*	*	+++	
Peaches (raw or canned)	++	+	++	

(*American Medical Association*)

\+ contains the Vitamine.
++ good source of the Vitamine.
+++ excellent source of the Vitamine.
− no appreciable amount of the Vitamine.
? doubt as to presence or relative amount.
* evidence lacking or insufficient.
V variable.

Thus oft-overlooked foods or parts of foods build up resistance to certain diseases like rickets, sore eyes, poor nutrition, loss of weight and strength, pus infections, tuberculosis, nervous diseases, scurvy, and perhaps many more, the underlying causes of which we do not understand.

We often suffer from a food deficiency although we may eat enough, perhaps too much, but we do not get enough of the right things. You can hardly pick up a newspaper without seeing something about vitamines, usually in advertisements about some food like yeast, or tablets of medicine to take, etc. My advice is to leave all these things alone, unless prescribed to you by your physician, and to eat the proper kinds of food instead (see pp. 57, 60). Also, you will be sure that you are getting real vitamines and it won't cost anything, nothing more than your regular food costs.

The next great fault with our foods is the way we concentrate them. The manufacturer may do some of it; we do the rest in our homes. My word of warning is to look out even for the "good cook," the one who fixes up dishes that tickle your palate but are short in many of Nature's ingredients and are concentrated in others enough to be poisonous. For instance, sugar is a concentrated food. Sugar as a food, on everyone's daily table, came into commercial existence only a couple of hundred years ago. One hundred years ago the average use of sugar in New York was only 9 pounds per person a year. Today, counting candy and all, we are using in America over 100 pounds per person a year. Sugar, strictly speaking, is not a natural food; it is manmade. It is obtained by extracting and concentrating sugar cane, sugar beets, etc., where it occurs in dilute form, very dilute as compared to our dried and granulated form; also it occurs with certain juices containing vitamines which are driven off in the making of granulated sugar and sirup. Diabetes is a disease of civilized countries where sugar eating is excessive.

Another example is alcohol, which also seldom occurs in nature. We make it by concentrating and fermenting Nature's original products. The result is something which is too concentrated for the continued welfare of the human body. Our intelligence, that thing which makes us different from lower animals, enables us to do this, but it also gets us into trouble. The use of alcohol is also of only recent occurrence in working peoples' lives.

Only 300 years ago did alcoholic beverages get into the daily life of the working class. Lecky[1], the English historian says:

> It was not until about 1724 that the passion for gin drinking appears to have infected the masses of the population, and it spread with the rapidity and violence of an epidemic.

At first alcoholic drinks were strong, like gin, brandy, and strong wines; ale and beer came later. Lecky further says that the fatal passion for drink was the most momentous event of the entire eighteenth century, far overshadowing politics and wars in its effect upon the people. Before 1700, only kings, lords and potentates were "imbibers" to any extent, and from the earliest Bible times history records its effects on bodily and mental powers.

Now, one would hesitate to say that a little sugar, a little alcohol, or even a little salt would harm the average person; but it is this question of concentrated form and amount taken which seems to be associated with some of the worst diseases of civilized man, diseases like diabetes, gout, perhaps cancer of the digestive tract, hardening of the arteries, appendicitis, ulcers, etc.

I would not have you think that sugar and alcohol are the only concentrated foods which man has produced and partakes of to his damage. White flour is a concentrated food; so is salt as we have it today; so are coffee, tea, even cream and butter; in fact everything which we have taken from Nature and made thicker than Nature puts it up is concentrated. Almost everything placed on the table before one to eat, unless we are very careful, represents Nature's intended food made short or "shy" on the one hand or "strong" on the other. These two things, we are lead to believe, underlie much of our stomach, liver, and bowel troubles and our low resistance to many diseases.

Finally, as a result of our faulty foods, new and strange kinds of germs grow in our intestines or bowels, driving out the harmless ones which normally grow there, and no doubt producing poisons which are carried to various parts of the body. The faults in growth of our children, our thin, weak, flat-chested people, or overfat, "pussy" people, our failure to fight off disease germs like those which cause pneumonia and consumption are now thought to be explained in large part in this food question. The success of our fight against consumption is believed to lie in building up

[1] Collis and Greenwood, "Health of the Industrial Worker," p. 275, 1921.

resistance to the tuberculosis germ rather than trying to kill off the germ.

To sum up then, civilized man's food of today has the following shortcomings:

1. It is apt to lack freshness or recentness of collection; yet we must be careful that fresh foods, milk, etc. are carefully inspected and free from parasites and disease germs.

2. It is deficient in vitamines and certain essential salts such as iodine, calcium, potassium, phosphorus, and iron.

3. It is excessive in concentrates, *i.e.*, things made thicker or "stronger" than Nature furnishes them.

4. It tends to produce acid in the body rather than basic or alkaline qualities to correspond with our body tissues.

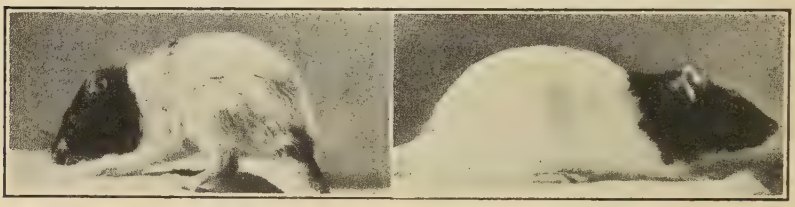


Fig. 14.—These rats were from the same litter. The dwarfed and rumpled one whose head hangs down did not get enough vitamines in its diet. (*Dr. E. V. McCollum in Hygeia.*)

5. It is short on cellulose, or vegetable pulp, and other forms of roughage.

6. It tends to change the kinds of germs which normally live in the intestines and to permit dangerous germs to grow there.

There are too many warm meals with hot soup, hot coffee, etc. When food is composed mostly of meat and eggs (proteids), it causes overheating of the body and too much putrefaction in the bowels, especially in persons who are not very active in their work. When food is too rich in starches, sugar or sweet things, and pastries (carbohydrates), it tends towards bloating and fermentation in the stomach and bowels, and towards diabetes, or sugar disease. When food is too rich in butter, cream, lard, olive oil and fats it tends towards indigestion and "acidosis," *i.e.*, too great an amount of acid in the body. With excess in any of these and not enough use for them, as for cold weather or exercise, most persons tend to become fat, or obese; others actually become thin.

Workers should avoid what is known as the poor man's diet which consists of too much hot, highly seasoned soups, white bread, oleomargarine, storage eggs, dried cereals, dried fruits, canned foods (vegetables, fruits, and meats), pickled and salted meats, fat pork, and canned milk. Some of these things, perhaps one-half of the food purchased, may have to be used because of the question of expense and the fact that if everyone demanded only fresh things to eat all the time, there would not be enough to go around. Man invented canning, flour milling, drying, and storage in order to have enough food on hand for the winter. But he is certainly not using his best judgment in using these foods

FIG. 15.—A sample of vegetables as nature supplies them. (*Evelyn G. Halliday in Hygeia.*)

exclusively when he can buy them fresh. How can we get back to natural food? It is difficult to do so in our complex civilization, but we can go some of the way. The difficulty is that Nature produces foods of one kind and we have fallen into the habit of eating foods of another kind.

For our purpose here, we see that Nature's foods are eight in number: (1) milk, (2) eggs, (3) grains, (4) vegetables, (5) fruits, including nuts, (6) meat and fish, (7) salts and flavorers, and (8) water.

As Nature supplies these foods, they are rich in minerals or salts, roughage, juices, and the protective substances called vitamines. Man is an omnivorous animal, eating both plant and animal foods and should therefore look to the following: (1) make a generous selection, if not every day, at least every week of food

from all of these eight things; (2) eat at least a part of it as fresh as can be obtained, such as green vegetables and fresh fruits; (3) eat certain things (we always know what are tasteful) in the raw or unprepared state; (4) eat more of certain outside parts of it, like whole grain so as to get the germinal part, also the tasty inside hull, or the healthy skin of the grape, of the apple, of the tomato, the inside skin of the orange peel, etc. Indeed, apple seeds, crushed with the teeth, are tasty and perhaps anticonstipative.

Instead, if you will note, man's custom is to prepare and elaborate each one of these things until the food set before him is very unlike that which he would find in the wild open country, unlike that which Nature grows and means for man to eat, very unlike the Armenian coal heaver to whom I once handed a bunch of grapes and stood surprised to see him down the bunch without spitting out skins and after simply crushing the seeds between his teeth; in fact he hardly took pains to spit out the stems. The hill people of India, who live along the slopes of Mt. Everest and the Himalaya Mountains, are reported by McCarrison to have almost none of the diseases of the digestive apparatus which we have, such as acid stomach or heartburn, dyspepsia, ulcer of the stomach, appendicitis, or even cancer of the stomach and bowels. A sense of well-being in their stomachs and bowels is their only sensation. We read also that the native island dwellers of the tropical seas, the negro tribes of Africa (Schweitzer), and savage life in general, are very free from these afflictions. Those who have studied these things report that these people, with their native instincts, live on simple foods eaten much as they get them with only a small amount of cooking, baking or roasting, and very little trimming or "refining." It appears that we must get back to a diet much more like Nature puts it up, if we would be healthy.

May I be permitted to detail a little more just how this can be done. Let us eat more raw and less canned fruits; eat more nuts, not roasted nuts, but just as they come; more raw and less canned vegetables, also more green vegetables like lettuce, parsley, onions, greens of all kinds; eat more whole-grain cereals and flours—it is all right to cook these—like "wheatlets," oatmeal, whole rice—we usually get only polished rice—whole-wheat bread, or graham bread and rye bread; eat more fresh meat and less bacon, ham, canned meats, dried meats and fish, less salt

meat and corned meats; also certain kinds of meat should be eaten more, like sweetbreads, liver, veal, giblets, fish, and also fowl; but on the whole, eat less meat and eggs, less soups and gravies, less pastry stuffs, and depend more on milk, vegetables, grains, fruits and nuts; less flavoring extracts and dressings, but depend more upon the flavors of the foods themselves; and, finally, eat much less sugar and sweets of all kinds.

Never sweeten fruit of any kind, even grapefruit or lemons; the acid in these fruits is exceptionally good for one. Fruit is Nature's substitute for sugar and for our sweet tooth. Nuts also take the place of sweet things very well. Native people do not get sugar. In the entire Coonor District of India, says McCarrison, the natives do not get as much sugar in a year's time as an average-sized American hotel will serve at its restaurant in one day; they also never see such things as chocolate candy, and very little candy of any kind. By religion they do not use alcohol. They are teetotalers.

In the matter of drink, Nature supplies water, milk, juicy fruits and vegetables. The natural things are also cheaper; compare grains by the pound and cereals by the package. In reality they are more satisfying; they satisfy hunger and thirst more quickly, and one eats and drinks less. There is less "gormandizing." Perhaps we eat so much because we are seeking for something in the food which is not there. All of these fancy foods and drinks of our everyday life were started as fancy things, as treats for special occasions and feasts but, like pointed-toed shoes which were meant for dancing and holiday occasion, we have taken them on as a part of our everyday life.

My personal rule and that followed in my family is never to buy canned food if the same can be gotten fresh. We prepare most of our own cereal. A peck of clean wheat (15 pounds) can be bought at a flour mill for 50 to 75 cents, and my children grind up a pound or two at a time in an ordinary coffee grinder. One pound of this whole-wheat cereal makes from 15 to 20 helpings, or more than a whole package of one of the dried cereals like "toasties." We look upon "toasties" as an emergency food only. It is true our whole-wheat cereal takes an hour or two to cook over a slow fire, depending upon how fine it is ground, but it is well worth it. It is cooked the night before; or, a simpler way is to bring it to a boil and then set it in the fireless cooker overnight. Indeed, wheat grains and dried sweet-corn kernels

are pretty tasty just as they are and, parched a little, a fine food with a fine taste!

This raises the question of what is the cheapest and most healthful diet. The following method in which to spend a dollar for food answers the question: milk, milk products (cheese, butter, etc.), and milk substitutes, 40 cents; fruits and vegetables, 25 cents; meat and eggs, 15 cents; bread and cereals, 15 cents; sugar, syrup, salt, etc., 5 cents. While the amount spent for milk and milk products may look large, it is not. In my family of five children and three adults we use 5 to 6 quarts of milk each day, and have maintained this proportion for years. The whole family is amply fed on $2.50 a day, as a liberal estimate.

It has been said that one good way to test the ability of a man you are sizing up to work for you is to see how much he eats, on the assumption that if his appetite is good, he has lots of energy to spend for work; but this is not always a safe rule.

Food poisoning is of fairly common occurrence. By food poisoning we mean any sudden illness due to the injurious property of food eaten. Poisoning from food is nearly always due to disease germs which have gotten into the food and grown there, so that whoever eats this food may have the germs start to grow within him, and thus cause the poisoning, which is really an infection. Almost always more than one person is made sick when food poisoning occurs; if only one is ill, then be on the lookout for appendicitis, heart disease, or something else than bad food which ails the individual.

There is no such thing as "ptomaine" poisoning because ptomaines are not poisonous when taken by mouth. The commonest germs which produce food poisoning are those closely related to dysentery, cholera, and typhoid fever, and also typhoid germs themselves. Some of these germs produce a quick infection or poisoning, for instance, within 2 to 24 hours after eating the spoiled food. The typhoid germs usually do not produce sickness until after several days and up to 2 weeks or more. Parasites, such as trichina in measley pork, and tapeworm may cause one to get sick at the stomach within a day or so after eating the infected meat. Some foods are naturally poisonous, such as some mushrooms, certain shellfish, and some parasites on plants, like ergot (sometimes found on rye).

Very often a person thinks he has been poisoned when the food which he has eaten is simply a little too indigestible for him at the

time; that is, it may have fish scales or seeds (cucumbers), but more often it is because he is tired, or overheated, or ate too fast, or is badly worried, or has heart disease or some other disease. Also, some persons get sick, and develop hives and perhaps asthma after eating certain foods such as crab meat, lobster, strawberries, eggs, milk, tomatoes, oatmeal, pineapple, and others. Sometimes, of course, one is accidentally or intentionally poisoned, the commonest poison being arsenic which resembles and tastes like salt.[1] My attention has been called several times in Ohio to person's mistaking baking soda (sodium bicarbonate) for baking powder and cream of tartar, both of the latter causing perhaps severe vomiting.

So-called "sausage poisoning" or botulism is extremely rare but very fatal. In America it usually occurs from canned vegetables, but in Germany, from large sausages and potted or canned meats. Such cans usually look and smell spoiled. Mishaps occur especially in home-canned goods; it is always safer to eat canned preparations put up by the regular manufacturer who understands the business better. The toxin produced by the botulinus germ is very poisonous in even fractions of a drop; hence a suspected food should not be tasted. It is the only known germ toxin which is poisonous when taken by mouth. With other germs the poisoning comes from their growth in one's body; *i.e.*, an infection is produced. Boiling or cooking easily destroys both germs and their toxins. Olive poisoning is also botulinus poisoning, which will probably seldom occur again because of a more careful government-supervised packing of ripe olives.

While not under the definition of food poisoning, we should not forget that both the "civilized man's diet" and the "poor man's diet" which I have critized above really lead to slow poisoning in the long run.

The accompanying table shows the causes and time of onset symptoms of all varieties of food poisoning.

[1] It is always dangerous around the farm or garden to place arsenic in salt shakers for dusting over plants. Recently in Illinois, a farmer's wife accidently poisoned her husband and two grown sons by this means, all three dying within a day or so.

TABLE 3.—FOOD POISONING

Definitions	I "Any acute illness associated with bacterial infection or intoxication of food consumed"	II "Any illness associated with injurious properties of food consumed"	III "Any illness associated with food"
Causes:	Shortest onset time	Shortest onset time	Shortest onset time
1. Infected food:			
a. germs (and toxins?)	2 to 3 hours		
b. germs only	4 to 5 hours		
c. toxins (botulinus only)	12 hours		
d. ptomaines (putrefactive products)	Denied as producing poisoning except by injection into the tissues		
e. food-borne infections: scarlet fever, diphtheria, septic sore throat	Few hours up		
2. Natural poisons:			
a. animal flesh (shellfish, etc.)			
b. plant tissues (mushrooms, etc.)			
c. minerals			
denied as occurring naturally in poisonous amounts in any food	.....	½ hour, up	
3. Parasites (in food):			
a. animal (tapeworms, trichina, ameba, etc.)	.....	Few hours to few days	
b. plant (mycelia, etc.)			
4. Poisons mixed with food	.....	Few minutes to few days	
5. Sensitizers (certain things to certain persons)	.....	Few minutes to few days	
6. Unbalanced diet	.....	Few days to few years (adults) ½ hour up (infants)	
7. Indigestion (acute) (denied as poisoning):			
a. physical state of body			Any time, any number of persons, but usually only one person
b. physical state of food			
c. physical state of surroundings			
d. mental state of person			

NOTE: Onset of symptoms may also not occur for many hours (under each group). The fear is that intervening meals may be wrongly interpreted as causal.

Most food poisoning occurs during warm weather and especially in connection with milk, or from chopped-up meats, sausage, and potted foods prepared too long in advance (more than 3 or 4 hours) of the time when they are supposed to be eaten (as at picnics, bazaars, barbecues, banquets, etc.). Milk, unless pasteurized, is much more dangerous than water because most disease germs actually grow in milk while they are only carried along by water and usually soon die off in it.

At least six common diseases are often spread by milk: typhoid fever, dysentery, diphtheria, scarlet fever, septic sore throat (severe tonsillitis), and tuberculosis. One should always use the best grade of pasteurized milk for family consumption, never raw milk unless it is possible to get "certified" raw milk, which is perhaps best for the baby, although five of my own babies thrived on pasteurized milk throughout their infancy.

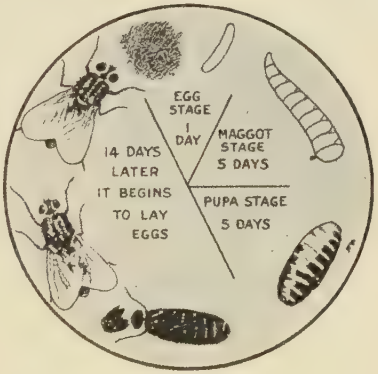


FIG. 16.—Life cycle of a fly. (*Dr. M. P. Ravenel in Hygeia.*)

Oftentimes the food handler, milkman, waiter, and even house-wife is a spreader or "carrier" of disease, especially food poisoning, typhoid fever, and sore throat, and infects everything handled for the meal. Recently, in Virginia, some 40 out of 60 persons who gathered for an old-time country church meeting and dinner came down later with typhoid fever. It was found that the woman cook who prepared the chicken gravy was a "carrier."

Flies and insects play a considerable part in infecting food because they are attracted by odors, stay about outhouses and garbage cans, and collect thousands of germs on their feet and wings. A single fly dropping into a milk pitcher or a custard, or gravy, or other soft food may infect it so thoroughly that, unless the food is kept at almost a freezing temperature (32°F.) or again cooked, it may be a living culture of disease germs, yet without any apparent spoiling of the food, within 4 or 5 hours' time.

In this connection I should point out that the ordinary ice box seldom falls below 50 or 55°F. in the summer time, and while

it may keep food from spoiling to the extent that it does not become bad smelling, it does not materially stop the growth of disease germs in any food placed within it.

It is a wise precaution, if you are suspicious of any food or water but practically have to eat or drink it, to take it at the end of the meal when the stomach is well filled with acid which is usually strong enough to kill disease germs.

It is rare to get poisoned by eating mutton or lamb or even fish. Raw oysters may convey typhoid and other diarrheal diseases, but great efforts are now made to keep oyster beds free from sewage pollution.

There is great danger in not using all of a can of food at a meal but keeping the rest of it for a later meal, because it is so apt to become infected with germs during the handling at the first meal. Protection can be had by thoroughly cooking it before serving it again. It is a good policy never to buy a larger can of food than you expect to use up at one meal so as not to have any leftovers which may cause disease at later meals. The sole danger in leaving part of a food in an open tin can is that of infection. There is nothing in the tin or solder which dissolves out and causes poisoning. Never eat or even taste anything out of a can which bulges with gas or "fizzes" when opened. Even here, however, thorough cooking or boiling would destroy germs and their toxins.

Signs of Health.—How do we know when the stomach and bowels are healthy? We should have no "stomach sense" other than a feeling of hunger or of well-being after a good meal. There should be no dyspepsia of any kind; no feeling of bloating or fulness, sour stomach, belching, constipation, soreness, or pain in the stomach; no headache from a "bad stomach"; no colic or cramps in the bowels; no nausea or "feeling sick at the stomach"; no loss of appetite; no vomiting. Whenever one has these things, let him first see that what he eats and drinks is correct. The woman must also remember that the first few weeks or months of pregnancy are usually accompanied with dyspepsia and sick stomach.

Dyspepsia is usually not caused by disease of the stomach itself. In fact, the stomach is an organ which is comparatively free of disease although it registers the presence of disease in many other parts of the body. Dyspepsia may be a family trait, in which case it is usually due to some faulty method of

preparing the food, some method which is handed down in the family; it may be due to worry or to eating too much when very tired; to foods which are too hot or too cold, causing congestion of the stomach and leading to ulcers; to waiting too long between meals and then eating too much; to a sitting-down job or quiet life; to eating too fast; to prepared foods, as indicated elsewhere; to too much fried foods; to certain foods which, to certain persons, are indigestible, such as strawberries, eggs, pork, corn on the cob, melons, and occasionally even milk.

Dyspepsia may be due to squeezing the stomach too much with a belt, corset, tight pants or vests and form-fitting clothes; also, in women, to pregnancy and especially following childbirth; to ruptures, in which the pushed-out gut drags the stomach down out of place; to big meals, or "gormandizing"; and very often to an infected gall bladder or gallstones; also to chronic appendicitis. Dyspepsia is sometimes due to blocking of the stomach at its neck or outlet from the puckering up of an old ulcer, while dyspepsia coming on after 40 years of age should arouse a suspicion of cancer.

The alcoholic person usually suffers from dyspepsia which is most noticed in the morning before breakfast. The smoker and tobacco chewer very often have dyspepsia of the acid or burning kind. Oftentimes *occupational poisons*, dusts, and fumes are the cause; almost any poison which gets into the system will produce dyspepsia as one of its symptoms.

Very often dyspepsia is not due to any of the above but is due to disease elsewhere in the body, such as tuberculosis of the lungs, chronic tonsillitis, bad teeth, and eyestrain.

Hyperacidity.—This form of dyspepsia is also known as superacidity, hyperchlorhydria, acid stomach, pyrosis, water brash, sour stomach, and "heart burn." It is usually due to, or associated with, too much hydrochloric acid in the stomach during digestion or the fact that the acid remains after digestion is presumably completed, so that persons may notice it even on awakening in the morning.

Hyperacidity is one of the commonest disorders of the stomach. It is usually on a nervous basis, and may or may not be associated with disease of the stomach or disease elsewhere. One may have it most of the time, but usually there are spells when it is worse. While it is more common in persons from 18 to 35 years of age, particularly in anemic girls and often associated with menstrual disorders, persons of both sexes and all ages suffer from it.

It is difficult to distinguish the symptoms of hyperacidity from those due to ulcer of the stomach (see below). In general, with hyperacidity one has so-called "heart burn," a sensation of pressure, discomfort, fullness and bloating of the stomach, and belching of acid gas. The appetite, weight, and strength remain good, vomiting rarely occurs, and the discomfort is easily relieved by eating more food, especially meat, or by the use of a little soda. Also the condition is usually corrected by watching the diet and observing good habits. One should not, however, get into the habit of taking soda or a mint after eating, as a condition known as alkalosis may result.

All the alleged causes of dyspepsia above stated may produce hyperacidity. Some are thought to be more important than others, such as chronic tonsillitis and disease of the gums and sinuses; thus, oftentimes, I have found that merely painting the tonsils with a weak solution of tincture of iodine will stop an attack of hyperacidity. Pipe smoking and the use of tobacco in any form, particularly when one indulges a little more frequently than usual, is a common cause of the condition. Even coffee, tea, and sometimes cocoa may arouse it. One should eat sparingly of candy, syrups, preserves, and sweets of all kinds. As a rule these things should not be eaten between meals and, if at all, late in the meal when they produce the least disturbance. Drinking more than a sip of water on just starting the meal may be a cause; cold water tends to stop the secretion of digestive juices until the stomach becomes heated again. In general, persons should use less of the foods which are known as acid formers (see p. 56). Oftentimes the mere eating of the meal more slowly, with water or liquids at the end and between meals, will stop a spell of "heart burn." The preventive treatment described below for ulcer of the stomach should be followed for hyperacidity.

Occasionally dyspepsia is due to an ulcer or ulcers of the stomach. More often, ulcers of the stomach and of the first part of the intestine (duodenum) produce no symptoms. In these ulcer cases, the person is usually between 20 and 40 years old. He may have attacks of sour stomach with pain, soreness, and fulness coming on every few weeks or so, but may be perfectly well in between times. A little saleratus or baking soda stops the burning sensation; so also will eating more food. If there is real pain, a sore spot, vomiting of blood, or sudden weakness followed

by dark or tar-like stools (the result of a hemorrhage), ulcer is undoubtedly present, and a physician should be seen at once, as fatal hemorrhage or perforation through the stomach or bowels may occur. Peritonitis is an all-too-frequent complication.

The preventive treatment for ulcer simply extends that laid down for hyperacidity. One should drop the worries of the day at meal time and not discuss business affairs, but dwell on pleasant conversation, jokes, stories, music, and the like. Unless one is underweight, he may try a semistarvation diet for a time. He should eat very slowly and chew well, especially for the first part of the meal. Let the meal consist of beef soup without seasoning, creamed vegetable soup, buttermilk, ice cream, soft-boiled, poached, or raw eggs, or crackers and milk, or bread and butter, chewed well. Usually meat cooked rare, fish, fowl, lamb, cottage cheese, or boiled rice for the main part of the meal are digested without disturbances. Starchy foods may be used, such as bread, baked potatoes, milk toast, zweibach, finely ground cereals or gruels with milk or butter. Olive oil is recommended. Fatty foods are usually well borne. For dessert one may take an eggnog, custard, soft or cooked fruits, fruit juices, or light puddings. Avoid hot drinks, coarse vegetables, spices, salt, sauces, fruit butters, and all concentrated or irritating foods or drinks. Constipation, if present, should be corrected with mild laxatives (see Constipation and Physic in the index).

Important general measures are, resting for 15 to 20 minutes after eating, getting more sleep, taking things easier, taking a longer time for convalescing from minor illnesses, wearing loose clothing, getting more exposure of the skin to the sunlight, avoiding the posture which produces a transverse crease across the abdomen, sitting and standing erect, and taking gradually more and more exercise each day. These measures tone up the digestive system, overcome hyperacidity, and tend to prevent the formation of an ulcer. Oftentimes a vacation helps marvelously. Some persons with loose abdominal walls should wear abdominal supporters. Small meals and eating more often are beneficial to many. Whenever the burning sensation occurs, it should be immediately corrected. This can be done by the use of baking soda, magnesia, lime water, and similar "antacid" substances. Each person soon finds the size of dose of these alkaline substances which is best, but ordinarily $1\frac{1}{3}$ to $1\frac{1}{2}$ teaspoonful of baking soda is sufficient. Again, do not use these continu-

ally, except with other measures which the physician may prescribe.

Acute Indigestion.—Common causes of acute indigestion are food poisoning (see p. 60), appendicitis, disease of the heart, kidneys, and brain. Attacks of indigestion are also often associated with bladder, womb, and ovarian disease, and with locomotor ataxia.

Cancer of the Stomach.—This disease is so important that it requires a special discussion. It makes up from 30 to 45 per cent of all cancers and is very often a form which persons let go until it is too late to save life. Men seem more susceptible than women in the proportion of about 60 to 40, while the white race is more frequently attacked than the colored race. Often there is a history of cancer in the family. Excess of food and drink appears to have some bearing in the development of the disease. The swallowing of too hot foods and drinks, some writers believe, may be a factor. A history of having had hyperacidity, or previous ulcer, is significant. Dr. Julius Friendenwald says, from his experience, however, that the cancer victim is not, as a rule, a chronic dyspeptic, and he has usually been in good health with a normal digestion until the onset of this disorder. He found that in 77 per cent of his cases the onset of cancer of the stomach was sudden and acute, while but 7 per cent gave a previous history of gastric ulcer.

The distinguishing symptoms with their percentages of occurrence in persons are summarized as follows: loss of appetite, 89; vomiting, 89; pain as an early sign, 84; gradual loss of weight, 98; vomiting of "coffee ground" substances in about one-fourth of cases; and passing of black or dark-colored stools in about 14 per cent of early cases. Both "coffee ground" vomiting and dark stools point to hemorrhage from the cancer. Difficulty in swallowing occurs as an early sign in 78 per cent of cases where the cancer is located at the lower end of the esophagus or the entrance to the stomach. Occasionally a tumor may be felt in the abdomen, but this is apt to be a late sign. Signs of an obstruction at the outlet of the stomach often occur. The X-ray picture and the laboratory examination of the stomach contents are very valuable diagnostic methods.

Dr. Friendenwald says:

> Every person over 40 years of age who is suddenly attacked with indigestion that does not disappear after a brief period of careful

dieting should consider the possibility of cancer and should seek medical advice. If, after a short course of medical treatment, no improvement is noted, and other conditions can be excluded, the suspicions of malignancy become even greater.

At this stage an exploratory operation is considered the only safe method of procedure. When a few weeks of treatment have not relieved a stomach disturbance in a person over 40 years of age, especially an indigestion which began with an abrupt upset and shows some loss of flesh, operation is the only safe resort known at the present day. This offers a 90 per cent chance of recovery if the cancer condition is recognized sufficiently early. Even here a 5-year cure is too often not attained.

Summary.—When one cannot stop his dyspepsia or stomach trouble in a week or two by proper food and drink, and by looking to the other causes above described, he should see a doctor and be examined thoroughly, tell all about his habits of living and working, and all about the diseases he has had in his past life, so that a diagnosis may first be made of what he has, after which relief or cure can almost be guaranteed.

Let me say that it is difficult, even for a doctor and sometimes a clinic of doctors with a laboratory at their elbows, X-ray and all, to make a correct diagnosis among all the possible conditions causing dyspepsia; so how can one make it on himself and tell what to do? Also, have patience in this matter. The stomach and bowels are on the inside, not on the outside where they can be easily examined. It may take several visits to a doctor or clinic for overhauling and study of your particular case to tell what is the matter. Indeed, perhaps only an operation can find and cure the trouble, which may be gall-bladder disease, gallstones, ulcers, appendicitis, or cancer. Most of the simpler things, however, can be ascertained and remedied after a visit or two.

THE BOWELS

Constipation is the commonest ailment of the bowels. It usually goes with dyspepsia, and therefore a large number of causes are to be considered. If there is pain with it, look out for appendicitis and *don't* take a cathartic; call in a physician. Usually whatever will check dyspepsia will cure constipation.

Constipation is more apt to be found in those who do mental work, or sitting-down work, and therefore get too little exercise. Yet close observation shows that exercise is not the true antidote

for constipation since (1) the physician sees many individuals who take no particular exercise of any kind and yet are not constipated; (2) the physician sees many bad cases of constipation among hard-laboring people, who do not eat the right things; (3) the physician sees many bed-ridden cases of bone diseases and crippling, where the patients are often fastened to frames or encased in plaster casts for months and years and yet are not constipated because he prescribes their diets; and (4) the advent of the automobile, elevator, etc., greatly decreasing exercise, has not been accompanied with any material increase in complaints of constipation. In fact, because people are turning to a more rational diet of vegetables, fruits, and whole-grain cereals, thus getting more vitamine *B*, constipation on the whole is decreasing.

For many individuals, however, special exercises for overcoming general sluggishness and constipation are to be recommended. The free pamphlet entitled "Dyskinesia," published by the Metropolitan Life Insurance Company, New York, describes the proper exercises in detail: "the wake-up," "the sigmoid appendix special," the "nutcracker," "churning" which tends to reduce the abdomen, "the crossover," "the menagerie," "the N-E-W-S," and "the star gazer."

Often constipation is caused by the habit of not obeying Nature's call for emptying the bowels; that is, one has lost his "rectal sense." People differ greatly in this matter since some can customarily go for two or three days and still not suffer. It is not wise to keep taking cathartics. One's food should be his cathartic, and the proper food will be (see p. 60). Some worry about apparent constipation when the bowels move only every second day. Often this is natural when certain diets are eaten. A change to a more natural diet (see p. 57) will usually be followed by a daily bowel movement of good size. One may conclude no harm results from constipation when he suffers from no dyspepsia or headache, and the stools are normal in consistency.

The writer believes that the wearing of a belt or any constriction of the abdominal cavity is a potent cause of both constipation and dyspepsia in persons who are not active in their work. The active laborer succeeds in exercising his abdominal muscles in spite of belts worn fairly tight. The oriental custom of wearing loose, flowing garments is certainly to be commended.

The following prescriptions are given for bowel injections or enemas which may be used in place of cathartics:

1. The 1-2-3 enema: Epsom salts, 1 ounce; glycerin, 2 ounces; and water, 3 ounces. Total, 6 ounces. Use preferably cold.

2. Combination enema: Epsom salts, 1 ounce; glycerin, 2 ounces; oil of turpentine, ½ to 1 teaspoonful; tincture of asafetida, ½ teaspoonful; and water, 4 ounces. Total, 7 to 7½ ounces. Use warm, if there is much bloating from gas.

3. Turpentine enema: Epsom salts, 1 ounce; oil of turpentine, 1 teaspoonful; water, 5 ounces. Total, 6½ ounces. Use warm or cold for obstinate constipation.

Diarrhea is a strictly abnormal condition. It usually means food poisoning or infection of the bowels and follows indigestion. It has, however, many possible causes. Where it is severe or lasts more than a couple of days or recurs every few days or weeks, the person should consult a physician.

One common sign of disturbance in the bowels, not necessarily disease, is the tendency to stay awake at nights. When the bowels are rolling around, one seldom sleeps soundly. Dreams are common. Nightmare is often a symptom of disturbed bowels. Bloating of the abdomen, pain, and colic are other signs.

Real disease in the bowels usually results quickly in weakness, anemia, and loss of weight and soon leads to emaciation and a bed-ridden condition. Sometimes parasites such as tapeworms, hookworms, and roundworms may be the cause. Hookworm disease is very common in the southern states and tropical countries where it causes anemia and laziness so that such people are called "poor white trash." It also occurs in miners. It is spread by the bowel discharges which soil the ground where there are no closets or privies, so that persons going barefoot or with leaky shoes get the worms in the skin of their feet (causing "ground itch") from whence they spread to the bowels. Hookworms can usually be driven out of the bowels by a single treatment lasting 1 to 2 days and costing but a few cents for the medicine.

Persons who have been in the tropics often get dysentery which may recur at intervals for years afterwards. The writer, while a resident physician in Cook County Hospital, Chicago, saw many such cases in ex-soldiers who had returned from the Philippines.

The list of causes of bowel troubles has been by no means covered above. The author would advise persons so afflicted to get medical aid.

Biliousness is an old-fashioned term for diseases supposed to be located in the liver. The liver, however, like the stomach, is not nearly so often the seat of disease as is imagined. The troubles called "biliousness" are most apt to be due to inflammation of the gall bladder and its ducts, to gall stones, to ulcers in the stomach or bowels, and also to chronic appendicitis. When jaundice (yellow janders) is present, we are more certain of disease in or around the liver. Hardening of the liver which follows chronic poisoning, alcoholism, lead poisoning, and the like may produce a slight amount of jaundice and even "water" or dropsy in the abdominal cavity. When a good cathartic does not relieve biliousness promptly, medical aid should be called in. One who suffers from "bilious attacks" or indigestion of any sort should watch the color of the stools. A light color, or stools which are partly dark and partly light, usually indicate trouble in the gall ducts or the gall bladder in the nature of something which is obstructing the flow of bile. Red or tar-like stools point to hemorrhage. A physician should be seen at once.

Gallstones seldom occur in persons under 25 years of age, and are said to be much less frequent in America than in Europe. Women have three-fourth of the cases, particularly those who have borne children. All conditions which favor stagnation of the bile should be prevented as far as possible; corset wearing, sedentary occupation causing a transverse crease across the abdomen (here one may raise his desk or work bench, or lower his chair), overeating, and too little exercise all predispose to both gallstones and biliousness.

Appendicitis causes about 12,000 deaths a year in the United States, most of which occur because the patient was not operated upon within 24 hours of the time pain started. This is preeminently a disease of young persons, according to Osler, 50 per cent of the cases occurring before the twentieth year and many more before the twenty-fifth year. The causes of its undoubted increase are unknown, but influenza, rheumatism, tonsillitis, local infections as of the teeth, pneumonia, and typhoid fever seem each to have a definite relation. Its immediate cause is invariably infection, and by one of the common pus-producing germs. Injury to the stomach or abdominal wall, a fall, heavy lifting, and other strains undoubtedly start many cases. I once saw a series of three cases which occurred in girls promptly after starting a job requiring the use of the right foot to press

down a foot treadle many times a day on laundry machines. A similar circumstance with the use of foot-treadle sewing machines should be kept in mind. Probably the wearing of tight belts and similar clothing restricting the abdomen is a factor.

This disease starts with cramp or a moderate pain in the "belly"; sickness at the stomach and usually vomiting follows within 2 to 4 hours. One feels thirsty, a little feverish, and more and more uncomfortable in the bowels. He notices, usually, that his bowels have not moved for a day or so. He should not take a cathartic, as this excites movements of the bowels and makes things worse. Neither should he take any medicine for pain. He should call a physician and accept operation at once, if such is the decision of the physician after consultation. Oftentimes blood tests show how things are progressing long before general symptoms get worse or better.

Chronic appendicitis probably comes from a repeating of the same causes as just stated, and especially from too much food, too rich food, perhaps too much candy and sweets, and other dietetic errors. Appendicitis is said to occur much more frequently among civilized than primitive people; also in some families more than in others, possibly due to family customs rather than to heredity.

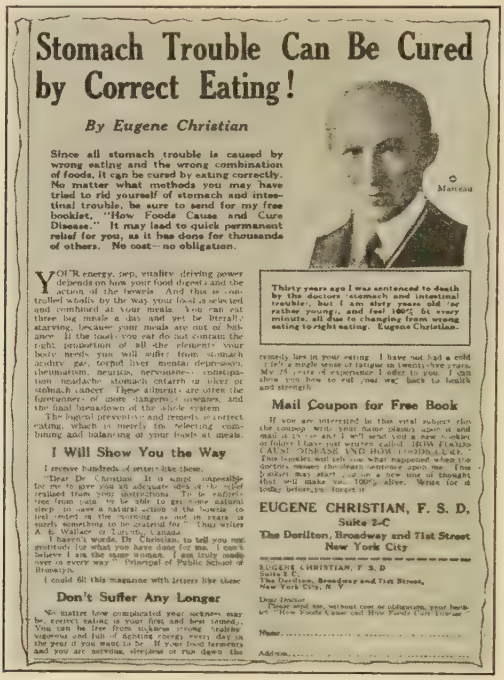
Piles or hemorrhoids are the bane of many people's lives. They are varicose veins of the rectum and anus. They are more frequent in young people forced to lead a sedentary life. Their principal causes are constipation, undue straining at stool, overeating which causes a congestion of the liver, the use of strong cathartics, occupations which require much sitting, sitting on a cold seat, sitting erect instead of bending forward when at stool, the closet stool too high from the floor (many foreigners prefer simply a hole in the floor), and diseases of the liver, bowels, and abdominal cavity, including those of the bladder and female organs.

When piles are only small lumps without pain or itching or bleeding, they may be let alone. Smearing with vaseline will often relieve pain and itching. When they suddenly swell with much pain, they may be relieved by applying a piece of ice. When they bleed, they are more serious, and if there is bleeding with each stool, a physician should be seen. They are often caused by the use of vigorous cathartics such as Epsom salts. Instead, the person should use a laxative such as petroleum oil, Russian oil, and other mildly acting physics. Great thought

should be given to the correction of the diet, using the simpler foods as described on pages 57, 60. When there is much itching, it is practically necessary to see a physician.

MEDICINES

This is a good place to repeat that it is plain foolishness to buy patent medicines anytime, or to get advice from drug store clerks,



Stomach Trouble Can Be Cured by Correct Eating!

By Eugene Christian

Since all stomach trouble is caused by wrong eating and the wrong combination of foods, it can be cured by eating correctly. No matter what methods you may have tried to rid yourself of stomach and intestinal trouble, be sure to send for my free booklet, "How Foods Cause and Cure Disease." It may lead to quick permanent relief for you, as it has done for thousands of others. No cost—no obligation.

YOUR energy, pep, vitality driving power depends on how your food digests and the action of the bowels. And this is controlled wholly by the way your food is selected and combined at your meals. You can eat three big meals a day and yet be literally starving, because your meals are out of balance. If the food you eat do not contain the right proportion of all the elements your body needs, you will suffer from stomach acidity, gas, torpid liver, mental depression, rheumatism, neuritis, nervousness, constipation, headache, stomach catarrh or ulcer or stomach cancer. These ailments are often the forerunners of more dangerous diseases, and the final breakdown of the whole system.

The surest preventive and remedy is correct eating, which is merely the selecting combining and balancing of your foods at meals.

I Will Show You the Way

I receive hundreds of letters like these.

"Dear Dr. Christian: It is simply impossible for me to give you an adequate idea of the relief realized from your instructions. To be entirely free from pain, to be able to get some natural sleep, to have a natural action of the bowels to feel rested in the morning, are not in years as purely something to be grateful for." Thus writes A. B. Wallace of Toronto, Canada.

I haven't words, Dr. Christian, to tell you my gratitude for what you have done for me. I can't believe I am the same woman. I am truly made over in every way." Principal of Public School of Brooklyn.

I could fill this magazine with letters like these.

Don't Suffer Any Longer

No matter how complicated your sickness may be, correct eating is your first and best remedy. You can be free from sickness, strong, healthy, vigorous and full of genuine energy every day in the year if you want to be. If your food ferments and you are nervous, sleepless or run down the remedy lies in your eating. I have not had a cold or felt a single sense of fatigue in twenty-five years. My 25 years of experience I offer to you. I can show you how to eat your way back to health and strength.

Thirty years ago I was sentenced to death by the doctors. Stomach and intestinal trouble, but I am sixty years old (so rather young), and feel 100% fit every minute, all due to changing from wrong eating to right eating. Eugene Christian.

Mail Coupon for Free Book

If you are interested in this vital subject clip the coupon with your name plainly upon it and mail it to me and I will send you a new booklet or folder I have just written called HOW FOODS CAUSE DISEASE AND HOW FOODS CURE. This booklet will tell you what happened when the doctors passed the death sentence upon me. This booklet may start you on a new line of thought that will make you 100% alive. Write for it today before you forget it.

EUGENE CHRISTIAN, F. S. D.
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New York City

EUGENE CHRISTIAN, F. S. D.
Suite 2-C
The Dorilton, Broadway and 71st Street,
New York City, N. Y.

Dear Doctor:
Please send me, without cost or obligation, your booklet "How Foods Cause and How Foods Cure Disease."

Name.....

Address.....

FIG. 17.—Advertising the healing art in this manner is warned against. (*Hygeia.*)

in fact from anybody who is not a doctor of medicine for the many ailments which afflict the human body. The crime of the age is the way people are humbugged by "know-it-alls," by quack doctors, diploma-mill "doctors," and by advertisements in the newspapers, magazines, and on billboards about medicines and cures "for all that ails you." Remember this: *A good medicine does not have to be advertised* nor called to your attention by sending you a sample bottle or package. Its ingredients are all it needs to advertise it and make it known. Only the simplest

of remedies and first-aid means should be used by lay persons. The peculiarities of uncommon or complex medicines, even if harmless, should be left to the physician to prescribe. Also, unless you are a physician you are not competent to diagnose what the trouble is and whether you need medicines, massage, adjustments, rest, exercise, or anything at all. In regard to any drug or the ingredients of any medicine, if you think it is worth while, you can look it up yourself, for, if it has any value, it will be described in the large book kept by all druggists and called the U. S. Dispensatory, and if it is official, in another book called the U. S. Pharmacopeia. These books may also be found in some libraries.

No worth-while drugs are kept secret, not one. Any drug advertised in newspapers, magazines, handbills, letters, little samples sent around, etc., which you cannot find in the Dispensatory is usually a humbug. If in doubt, ask your physician about it, or write to the American Medical Association, 535 North Dearborn Street, Chicago, Ill., or to the Pharmacological Laboratory, care of U. S. Department of Agriculture, Washington, D. C. Never buy a drug which you are told in the paper or magazine to go and get at a drug store. Such is just a scheme to sell the drug.

It is a good principle *never to pay* any attention to "reliefs" or "cures" marked or signed "Adv." (meaning "Advertisement") at the end of the article, *nor to buy anything which is advertised for health or to prevent sickness*, or said to cure sickness, whether it is food, clothing, eye glasses or medicine.

Also, a good doctor does not have to advertise. Never go to a doctor who has big signboards around his office; or who puts ads in the newspapers or in street cars; or who throws handbills around. Such a man is known as a "quack." He thinks much more about how to get the money out of you than the disease out of you. Some renowned and entirely trustworthy physicians[1] have undertaken, in certain newspapers and occasionally in magazines, to advise the reading public about sickness, but these physi-

[1] Prominent among these medical writers of trustworthy press articles dealing with health and disease are Dr. William A. Evans of the *Chicago Tribune*, Dr. Royal Copeland, of New York, Dr. William A. Brady, of New York, Dr. C. A. L. Reed, of Cincinnati, Dr. Woods Hutchinson, and some others. Your health officer or State Health Department can tell you "who's who."

cians have nothing to sell, and do not represent companies which do, or "patent medicine" manufacturers, nor do they keep talking about the same drugs, the same treatments, or the same appliances. The quacks always do, although sometimes they may have a list of several things they are trying to sell.

Some drug firms prepare almanacs, remedy books, nursing books, etc. Taboo them all. Again, never pay any attention to testimonials in which you read about the value of some drug or tonic, or about some "great" doctor; nor to pictures of people who say they have been cured or relieved, etc. Such testimonials are bought and sold by the thousand, sometimes the same testimonial being used for countless different remedies, and for years after the foolish people who wrote them are dead. Don't be one of the "suckers" of which Barnum said that one was born every minute.

Some day laws will undoubtedly be passed to prevent the making of money out of health and disease. Some day the people will finally realize that *it is wrong to commercialize the healing art* and to patronize any doctor or business firm which does do so, just as wrong as to commercialize religion. As you see, part of the blame is on the foolish people themselves who, when they instinctively feel and are plainly told they will be humbugged, go ahead and try it anyhow. The danger always lies, not in the fear that quacks or nostrums will harm you—they will take no chances of lawsuits—or that they may not actually do some good, but in the delay of getting proper treatment early enough and in putting the responsibility for making a mistake about your trouble upon *you* yourself, instead of upon a physician who proceeds scientifically by first making a diagnosis or determination of the real cause of your trouble and prescribes accordingly.

Treatment is always relatively simple when once the disease or trouble is known. Indeed, nearly all the worth-while remedies and methods are described in single books costing a bare $5 or so. The medical student's long training is not so much to learn treatment as it is to learn diagnosis and how to head off complications.[1]

[1] A very popular health and medical magazine called *Hygeia* is now published by the American Medical Association, 535 North Dearborn St., Chicago, and may be found on newsstands or subscribed for directly, and is much more reliable than most physical culture magazines, "health messages," etc. It also answers questions.

Now, the doctor and the dentist have a right to make fair charges for their work and services; they have spent much time and money to learn their professions which are endorsed and encouraged by our Government. We have to have them and they have to live. Let us say that it is all right for them to "businessize" the money end of their work, but that it is wrong for them or anyone else to commercialize it, or attempt in any way to get wealthy out of it, for it is getting money out of misery and sickness.

The power to control humbuggery and to get good service lies in your own hands. If correct food and correct living do not better your health, select a family physician and confide in him instead of trying hit-and-miss methods on yourself and helping some patent medicine firm or quack to get rich at the risk of *your* health and *your* pocketbook. If you need a specialist, let your family physician advise you whom to get.

CHAPTER VI

THE SKIN

In spite of the fact that man is a land animal and lives in the air, he is, in truth, an aquatic animal composed of a mass of living cells each of which must live in a liquid medium, the composition of which resembles sea water very much and recalls the process of evolution by which all animal and plant life is thought to have originated in sea water. The skin would appear to be a contradiction to this observation, but even here the outer layer is only partly dry and composed of dead or dying cells, the deeper ones of which are bathed by this common fluid called "lymph." The outer layer is really a protective layer to all the body cells within, which would otherwise quickly dry up and die in the air.

Structure and Relations.—The skin has two layers, the outer dead one called the "epidermis," which is continually being shed or peeled off in microscopic flakes or scurf, and an inner, usually thicker layer called the "dermis," or true skin, which is well supplied with lymph, blood vessels, nerves, and sweat and oil glands. From the two layers of the skin have come many important appendages such as the hair, the nails, and even the teeth, the lens of the eye, the labyrinth of the inner ear, the brain and spinal cord, and all the nerves! Hence we see that by an in-folding process during growth in the womb of the mother, the skin, which is an external organ for registering all sorts of external impressions, has, through the nervous system, become connected with every cell in the body and with all the organs composing the body.

The purposes of the skin are: (1) protection from injury, from drying, from light, from heat and cold, and other physical agents; (2) protection from bacteria and parasites; (3) the evaporation of water, or sweat which comes through from the lymph and blood; (4) the regulation of heat in the body with which it is closely associated in action with the heart, blood vessels, and the brain; (5) the secretion of oil to keep the skin soft, and of waste products by which it helps the kidneys and bowels; (6) the

absorption of certain substances like grease, ointments, some drugs, and unfortunately certain poisons; and (7) the location of nerve endings which register touch, pain, heat, and cold.

The skin is ordinarily self-protecting; that is, it acts as its own policeman and when one is in health requires no additional ointments or lotions to keep it healthy. In fact, such things tend to make it unhealthy. Clothing, bathing, exposures to the air and to sunlight, heat, cold, friction and pressure, all influence or change it very markedly. Clothing tends to weaken it; yet man has discovered that this is the lesser of two evils when it comes to protection in very cold or very hot climates, or where the light is intense. The skin is kept hardened and healthier by frequent short exposures out of doors in cold weather with the hat off or without the overcoat.

The active worker usually has little difficulty in wearing the right amount of clothing, but the indoor worker and especially the worker who must remain quiet or sit a great deal of the time loses the normal tone or health of his skin and suffers many afflictions and diseases in consequence. This is more so when the clothing is too thick and is worn too tightly. Indoor workers usually dress too heavily. This brings about a great likelihood to colds and to loss of resistance to diseases. Old people must generally dress warmer than younger people because the blood supply to the skin is not so good.

Bathing the skin is not essential to health. It is a custom which is seldom indulged in by people living in the Far North but is almost a daily habit of those in warm countries. The act of bathing, however, stimulates the skin, brings the blood to it, and otherwise increases its tone. This is due principally to the effect of the temperature of the water used, as warm followed by cold water, or the cooling effect of the evaporation of the water from the skin. Exactly as good results may be obtained by sponging as by bathing and nearly as good by air baths, *i.e.*, exposing the skin with the clothing off, particularly if the air is cooler than that of the body (98.5°F.). With water baths or air baths, rubbing the skin does much good. One would do well to take a partial sponge bath daily or air bath for a few moments at least twice a day. This is easily arranged on awakening and dressing in the morning and just previous to undressing for bed in the evening. The man while shaving, and the woman while dressing her hair, have an excellent opportunity to take an air bath stripped to the waist.

Bathing with water should be looked upon as a cleansing process rather than as a necessity for maintaining health. The Ohio Public Health Association advocates at least one bath a week in its rules for keeping healthy. The daily cold bath is a violent exercise for the skin, heart, and circulatory system which is all right for the vigorous and those in practice, but not the average man or woman. For those in dirty work, work which wets the clothing, or hot work, bathing should be frequent; for others it should be considered a matter of keeping oneself clean and free from odors.

Many persons have skins which are sensitive to water, causing eczema and other troublesome skin afflictions. For such persons the air bath is especially to be recommended. This sensitiveness is probably due to the drying effect of the water on the skin, which effect is irritating to many persons. It is usually not due to anything in the water or even in the soap. When the water is very warm or too alkaline from the kind of soap used, or from washing powders, and when industries use irritating solutions, the skin tends to crack and to lose its oily protection; also the expanding and contraction by heat and cold of the dead outer layer of skin, which has lost its elasticity, help the cracking along.

Fig. 18.—Beauty cream, skin foods, etc., are poor attempts to better Nature. (*Joseph V. Klauder in Hygeia.*)

It is estimated that one person in every twenty has an overly sensitive skin, and where not over two or three persons in a hundred have skin eruptions or eczema in a given trade, it is probably the individual and not the occupation which is at fault.

Cosmetics.—Everyone wishes for the "peach-bloom complexion." Those who are much exposed to the weather can certainly not expect to have it although flushing or blushing should occur easily in the cheeks. Rather than use cosmetics and rouge which give only a fixed color, not one which comes and goes as in nature, other methods more healthful to the skin may be used. Before an evening "date" a brisk bath, especially a shower bath or even a sponge bath, will make the blood vessels of the cheeks so sensitive that color will come and go with any

slight excitement or interest for several hours. Rubbing of the cheeks, forehead, and neck with a rubber complexion brush will materially aid and at the same time massage the face. Where one cannot maintain a fair complexion by attention to personal habits and the methods recommended, no "beauty doctor" can improve the situation and at the same time maintain the health of your skin.

If the complexion is pale, pimpled, sallow, muddy or mottled, one should see a skin specialist, not a "beauty doctor." Remember that going in and out of doors in the cold weather adds greatly to the health and beauty of the skin. One should do this several times a day without hat or coat for a few moments.

FIG. 19.—The best face paint is the open air. (*Joseph V. Klauder in Hygeia.*)

It gives a decided benefit and oftentimes a rapid return of a healthy skin and fine color to the face.

Occupational Influences.—Authorities state that from one-fourth to one-sixth of all skin diseases are due to one's work. These are largely an inflammation called "dermatitis" or eczema. R. Prosser White says there are 46 different diseases of the skin that are well known to occur in about 120 different occupations. Sometimes as high as 25 to 50 per cent of all the workers on a given job will have skin diseases, especially in jobs exposing the hands to oils, greases, solvents, and lubricating compounds. Colored people are quite free from skin diseases, also dark-skinned persons suffer less. Old persons are more susceptible. Hot jobs, such as around furnaces, cause much skin

trouble. Sometimes parasites occur in straw, etc., producing skin infections. Many workers make the mistake of using strong soap and stiff brushes to clean the skin, which is the real cause of their skin trouble. Workers exposed to fine metal dust are apt to have blackheads and later skin eruptions, as are also those exposed to soot and coal smoke.

Calluses.—Rubbing and squeezing causes the skin to thicken and form "calluses" (callosities) which is Nature's method of protection. Such hardened places, however, have very little resistance to infections when injured or punctured because of the poor blood supply which is present. In a similar manner the part that has been exposed to the air and light becomes thickened, oftentimes colored or pigmented, and occasionally freckled. These are all protective measures on Nature's part, and persons so exposed had best let things alone.

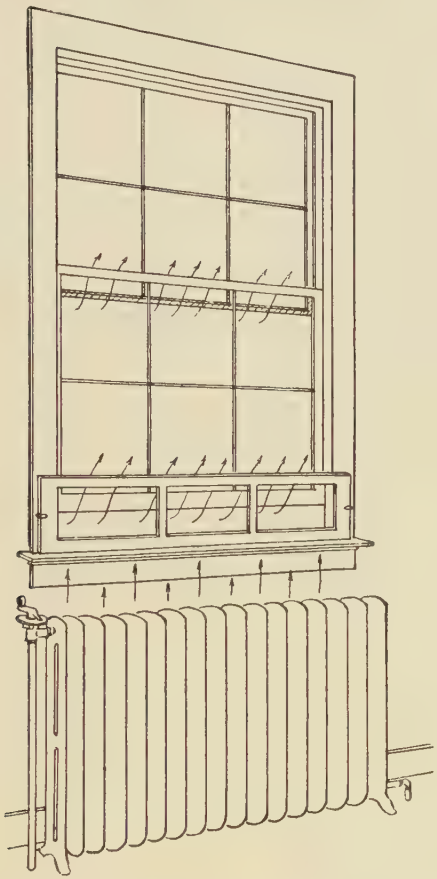
The sun's rays are very beneficial to the skin and to the whole body. They are tonic and prevent or stop many diseases. There is much evidence of the good effects of ultraviolet rays found in the sunlight, sky-shine, and even in the shade on bright days. These bronze the skin; bronzing is said to promote health. As a rule, people should expose the skin more to daylight, wear thinner clothing, and light-colored clothing. The top of the head should be protected from the heat of the sun.

Ventilation.—We now know that the chief influence of good ventilation is not upon the lungs but upon the skin and, through the skin, upon the heart and circulatory system. Ventilation means the maintaining of healthful atmospheric conditions. As civilized people we have largely lost our "ventilation sense," especially our "heat sense," while we have become too sensitive to cold for our health. It is, therefore, necessary to call attention to certain fundamentals as we understand them today. In brief these are as follows:

1. The *temperature* should not exceed 68 to 72°F.[1] for indoor workers who must work quietly (sedentary workers); 65°F. for semiactive workers and, if possible, not over 60°F. for active

[1] The New York Ventilation Commission considered that 68°F., called the "critical temperature," was the safest upper limit for school rooms and that window-ventilation, using deflection boards on the sills, with radiators beneath the windows and outlet vents near the ceiling on the wall opposite the windows, is a better method for ventilation than mechanical or fan systems. The windows admit fresh, "solarized" air. School children had 70 per cent less colds in rooms ventilated this way.

workers. It should be measured with an ordinary thermometer up to 72°F. and, when above that, with a wet-bulb thermometer which is more accurate for showing comfort. It is thought that air which is too warm leads to lobar pneumonia.



(*S. H. Wheeler Estate*)

FIG. 20.—Correct window ventilation showing deflector on sill and proper location for radiator. (*Dr. Robert F. Jones in Hygeia.*)

2. There should be a constant moving of the air either by natural ventilation, the use of electric fans, or the fact that heated air rises, if there is an outlet above, and cooler air takes its place (gravity ventilation). Cool drafts should be avoided except where one is moving about. The more active the work, the more the air should circulate.

3. Dampness or steam should be avoided, especially if the air is very warm or cold. When the air is damp and cold, there is a danger of broncho-pneumonia.[1] Dampness under foot is a danger to health, and workers so exposed should wear waterproof foot covering. The relative humidity, that is, the per cent of moisture in the air, should lie between 40 and 70 per cent, but variations above or below this amount for a day or so are not necessarily bad.

FIG. 21.—Good ventilation and illumination are associated with happy, healthy workers. Note the special fans (of slow-moving type) for stirring up a sluggish atmosphere.

4. There should be a constant variation in each of the above three conditions—temperature, air movement, and humidity—throughout every hour of the work day. These variations should be greatest for those who are most active at their work.

[1] "If American houses were kept at 65° instead of 70°, and English houses at 65° instead of below 60°, there would be less pneumonia in America and less bronchitis in England." Dr. C.-E. A. Winslow of Yale, addressing International Institute of Hygiene, Paris, 1927.

5. As for getting fresh air to supply the amount of oxygen needed and to dilute the carbon dioxide which we exhale in every breath, one need usually have no concern. Nature provides for enough air and enough dilution of our breaths to protect us under all usual conditions of life and work except where one is in a mine or may be compelled to breathe dangerous gases, fumes, smoke, or other poisons added to air by other than human beings or animals.

Our ordinary building construction provides for plenty of in-leakage of oxygen even when the windows are closed, so that it is not extra oxygen but the cooling and stimulating effects of the incoming fresh air on the skin which we should have; hence the statement above that ventilation is an affair of the skin rather than one of the lungs. As it concerns our health, it is much more a matter of physics than a matter of chemistry.

Note also that, out of doors, the air is nearly always cooler about the head and shoulders, and warmer about the feet (from heat retained in the ground and from the friction of the wind on the ground). Indoors, however, the conditions are reversed in our usual methods of heating and ventilating. Here, perhaps, lies the "black beast" of bad ventilation. The ancient Roman avoided this by placing the heat under the floors (the hypocaust). We have much yet to learn about health in relation to heating and ventilating.

The English sum up the ventilation question from the health point of view as follows:[1] The air should be cool rather than hot, dry rather than damp, slow moving rather than stagnant, and constantly changing in temperature rather than uniform and monotonous.

Probably not one person in a hundred knows even these secrets, and yet they are fundamental in maintaining health, not only of the skin but of the whole body, and in building up a resistance to disease. Particularly is this true of diseases of the nose, throat, and lungs. The health of the skin also depends much upon the stimulating effects of heat and cold.

The most economical way to heat a house is to keep different rooms at different temperatures. In the first place it is stimulating to go from one temperature to another in moving about the house. Also, rooms like the kitchen or where one is walking

[1] Collis and Greenwood, "Health of the Industrial Worker," P. Blakiston's Son and Company, p. 295, 1921.

about do not require to be heated to more than 60°F. It is a great health strain and quite unnecessary to expose oneself to much heat during the cooking of a meal. Windows or doors ought to be used for ventilation for the double purpose of keeping the kitchen cool and invigorating and of giving the steam, odors, and perhaps gases from the stove a chance to escape. The hallways should not be heated. The living room should be heated to about 70°F.; also any other room in which one is expecting to sit down and be quiet. The bathroom or any room in which one intends to take a bath, should be heated to about 75 or 80°F. The bedroom may be thrown open to the rest of the house during the day, but it should be closed off by shutting the door at night and it should not be heated at all during sleep. Instead, a window should be kept more or less open for cool air. Even the smallest of babies should be kept in a cold bedroom at night (see comment, p. 196). It is said to cost as much to heat a room from 58 to 72°F. as it costs to heat it up to 58°F. in the first place. Hence one can save greatly on the fuel bill by having the general heat only 60°F. and then using a fireplace, small stove, or electric heater in the living room or bathroom for the extra heat required for comfort. Needless to say, care must be taken to see that stoves and gas heaters are properly connected to flue pipes and chimneys to prevent carbon monoxide poisoning (see p. 128). Open fires, as from fireplaces and radiant types of gas stoves, supply a very beneficial form of heat, known as "radiant heat," or "sunshine in the home" (Leonard Hill). Since they are usually near the floor, one may get heat in this way at the level of the feet and ankles, and cooler air at the level of the head. The cold draft from the rear may be prevented by dropping a blanket from the seat of the chair, or the back of the chair, to the floor.

Skin Repair.—The skin is a remarkably vigorous organ. As we know, it grows rapidly to repair a wound, much more rapidly than the deeper tissues below, so that it often heals over too fast, leaving germs and foreign matter beneath. It is so well supplied with blood and nourishment that whole sections of it can be taken off and transplanted upon a raw surface even on another person, where it usually starts to grow new skin very promptly. Even when a small connection of skin remains in a part which is nearly cut off, like the finger, or nose, or ear, this

connection of skin often supplies enough vitality and nourishment to heal back the part.

Signs of a Healthy Skin.—We may know the skin is in a healthy condition when it has good color, perhaps slight pigmentation or bronzing, elasticity, moisture, warmth, and oiliness. "Goose flesh" or "goose pimples" which appear promptly on the skin when it is exposed to cold is a sign of good tone in the skin. So also are flushing, or reddening, and blanching. Moisture, with some sweating, is another sign of health; this quickly disappears when a fever is present. A slight amount of scurf or shedding of dead skin is normal, as is likewise much of the so-called dandruff in the hair. It shows more plainly in the hair because it has more chance to accumulate there before being removed.

We suspect that something may be wrong with the skin when it has certain nervous symptoms, such as itching, tickling, burning, smarting, pain or tenderness, sensations of pressure or bursting, and also when there is no feeling when touched. Certain blood-vessel disturbances in the skin are abnormal, that is, at fault, where there are birthmarks, red, white, brown, or blue spots or places, swelling, or glossiness. We may know the tissue of the skin itself is diseased when there is inflammation, watery discharges, great thickening or great thinning, moles, hairy patches, small cracks, ulcers, hives, pimples or boils, scales, scabs, warts, or tumors. Oftentimes these signs of a diseased skin are associated with certain diseases in the body. We well know that many communicable diseases show their effects in the skin, such as measles, chickenpox, smallpox, scarlet fever, syphilis, typhoid fever, typhus fever, and erysipelas.

SKIN DISEASES

The diseases of the skin are so numerous as to require a large volume to discuss them. General observations and some simpler ones are all that we can consider here.

As a rule, any skin disease which is associated with fever, or private disease, or with a feeling of ill health is something which should demand a physician's attention immediately. Many such cases are contagious, so that the individual should isolate himself at once from other people until the doctor arrives, when he will be further advised. Skin diseases which itch are usually not of grave significance; on the other hand, those which do

not itch or have other unpleasant sensations are apt to be signs of serious disease, such as syphilis and others. However, these are only general statements.

Hives usually point to some irritant, or bite of an insect, or to some digestive disturbance. Some people easily develop hives after eating certain foods; others, when exposed to certain plant pollens and parts, such as from the poison ivy, rye and other grains, and even flowers and vegetables. Even fear produces hives in some persons. Local treatments for hives consists of vaseline, collodion, baking soda, starch paste, touching with weak ammonia, formaldehyde (1 per cent), carbolic acid (2 per cent), vinegar, tincture of iodine, etc. If after one or two applications, or a day's time, relief is not obtained, medical aid should be sought.

Cold sores are usually signs of an invasion of the body with certain germs like those of colds, influenza, pneumonia, meningitis, or food poisoning. They are common in malaria and may occur in slower forms of arsenic poisoning. While troublesome and painful, cold sores are rather good signs since they usually indicate good resistance. They practically never leave scars and are short lived and should not be treated too much. Usually an application of cold cream, hot water, vaseline, carbolic acid (2 per cent), formaldehyde (1 per cent), rubbing alcohol, spirits of camphor, "artificial skin" (flexible collodion), or touching with tincture of iodine will suffice.

Pimples or acne, are so common between the years of 14 and 25 as to be considered almost universal. They occur as a rule on the face, neck, chest, and back. While directly due to germs, predisposing causes are the main things to consider. The skin is usually too greasy; hence lathering with tincture of green soap helps much. They are probably due to faulty diet, but when once started, they tend to spread. For this reason great care should be taken with each one, especially during bathing, because the germs which are present in the "matter" (pus) tend to lodge in the pores of the skin in the neighborhood and start new pimples. Some think that eating candies, syrup, and too much sweets causes them. Perhaps pastries and highly greasy and seasoned foods are also a factor. These may cause a change in the normal intestinal flora (the germs which live in the intestines), which permits poisons to be formed and absorbed into the system. As a rule, however, pimples, boils, and carbuncles are

due to germs which get in from the outside, perhaps in a small wound, a razor cut, an ingrown hair, or in a place where a hair has been pulled out, or where blackheads have become infected, or where oil glands and sweat glands have, for some unknown reason, become plugged up, a circumstance which is certainly much rarer than people think.

Any occupation using gasoline, naphtha, benzol, fat solvents, oils and cutting compounds, certain dusts, or irritants is apt to be associated with pimples, boils, such as "machinist's boils," and other skin complications.

The idea of a "run-down system" as the cause usually means that the individual should give particular attention to his habits, diet, and mode of life. Occasionally one recovering from an illness is predisposed to these conditions. Sometimes acne lasts for years with great disfigurement of the skin, but it invariably ends of itself unless some constitutional disease is present. Very often diabetes is associated with boils and carbuncles.

A recommended procedure for pimples is to adopt as simple and natural a diet as possible, cease rubbing or irritating the skin, and lead a very regular life in every respect. Borated vaseline or a salve composed of precipitated sulphur, 1 dram, benzoinated lard, ½ ounce, and lanolin, ½ ounce, heals up many cases. The compound resorcin ointment (N.F.) may also be used. Each individual pimple or pustule should first be softened by applying the ointment or salve on a piece of cotton, especially at night. As soon as a white or yellow top, which is "matter" or pus, appears, it should be opened with a sterile acne lance or a large needle and the pus carefully removed so as not to touch any other part of the skin. To do this in a sterile way, cover the spot with tincture of iodine, then pass the point of the needle or lance quickly through a flame, as from a match (which kills all germs upon it), then open the pimple and catch the pus upon the instrument tip. When "matter" is present do very little pressing because this tends to squeeze the pus and germs into the neighboring tissues and perhaps to set up a boil, or a carbuncle, or to cause blood poisoning. Repeat this procedure for each "ripened" pimple, always sterilizing the skin with the iodine and sterilizing the lance or needle so as not to transfer pus and germs from one pimple to the other. Very often the mere application of vaseline itself for as long a period as overnight will cause them to absorb and go away. The vaseline aids Nature by keeping

them moist, warm, and soft, giving the rich blood supply beneath a chance to exercise its healing powers.

In troublesome cases the doctor may recommend certain ointments, ultraviolet light, X-ray, and vaccines. Sometimes an "autogenous vaccine," that is, one made from the germs found in the pimples, will clear up this condition. Those located on the back of the neck or in the ears are more serious, since they often lead to carbuncles or severe boils.

Boils.—A boil may sometimes be stopped by applying carbolic acid (5 to 10 per cent), or tincture of iodine, several times, preferably by a needle or sharpened toothpick inserted into its top. Borated vaseline under a piece of gauze may next be used. Considerable headway can be made with boils and carbuncles when once started by applying hot dressings made of gauze soaked in hot boric acid solution. This solution is made by putting a teaspoonful of boric acid crystals in a quart of hot water, soaking the gauze in it, wringing the gauze out as dry as possible and applying as hot as can be borne. The gauze should be covered with oiled, waxed, or paraffin paper (as from a corn-flake package), and a covering of cotton and a bandage applied over this. In no case should bread-and-milk poultices, linseed-meal poultices, and similar old-fashioned poultices be used upon boils and carbuncles, because germs readily grow in these materials. Hot muds and plasters had best not be used except under a doctor's supervision, principally because they tend to smear things around and spread infection, whereas the gauze poultices tend to absorb it into the substance of the gauze itself.

Dandruff.—Most of the dandruff which alarms people is the natural scurf coming off from the scalp and collecting in the hair. It can in no wise be stopped. It can be combed out, which is a beneficial thing to do, because combing or brushing massages the scalp and, for indoor workers, is an excellent health measure. When dandruff becomes a disease, there is present an excessive amount of scurf which may be either dry or oily, there is itching, and there is invariably an extension of the disease down onto the forehead, neck, and sometimes back and chest. An extra amount of scaling off can be found in these areas. Furthermore, the hair comes out more readily than normal, is lusterless, stiff, and usually dry, and often changed in color or becomes gray. Baldness results in time.

While the fundamental cause of dandruff is an unhealthy scalp, it is often difficult to determine what causes it. The following are common causes: poor general health, lack of bodily exercise, too much indoor life, lack of proper care of the scalp, heavy hats and tight hat bands which tend to shut off the circulation to the scalp, wearing the hat too much, improper food over long periods of time, and perhaps some infection of the scalp.

The prevention of dandruff is ordinary cleanliness of the scalp, that is, a head wash about once a week, more often if in dirty work. The further control is based on increasing the circulation to the scalp. Scratching is Nature's method. But it may be done by combing the hair and rubbing with a brush night and morning until a slight glow or pinkness appears. This is the most practical massage for the scalp. The only virtue to be found in shampoos, scalp lotions, hair tonics, and sundry alleged treatments, beyond the cleansing, consists in the irritation produced.

When dandruff is noticeably present, clean the scalp with warm water and ordinary toilet soap once a week, dry, then rub in well a lotion composed of resorcin, ½ teaspoonful, castor oil, 1 teaspoonful, and alcohol enough to make 5 ounces. If scales and crusts are thick, soften them first in olive oil and then remove with hot water and green (or soft) soap; then use the lotion. Repeat two or three times a week. If there is no improvement, see a physician or skin specialist instead of a barber.

Hair Dyes.—There is danger in practically all hair dyes used. Some of them cause lead poisoning, some are very irritating and kill the hair roots, while all have to be reapplied at frequent intervals because the hair normally grows about ½ to 1 inch a month. It is impossible to dye the hair roots so that the hair will grow already colored. Sun baths have been used to darken the hair as well as the skin.

Since gray streaks or gray locks are disturbing to many persons in youth or middle age, let me describe one of the simplest and yet most efficient hair dyes. It is in fact one of the commonest dyes used in patent preparations selling for from $1 to $5 per bottle but costing only a few cents. This is one-half of 1 per cent silver nitrate made up in distilled water. It is a little more effective if made very slightly alkaline with ammonia. A pint bottle of distilled water should contain about ½ teaspoonful of crystals of silver nitrate and less than one-tenth of a drop of

ordinary washing ammonia. The ammonia may be made dilute enough by putting one drop in a tablespoonful of distilled water, pouring it out, and then stirring the spoon in the solution of silver nitrate. If the ammonia is stronger, it will cause a clouding in the solution which is undesirable. This should be kept in a dark bottle away from the light.

About one-half cupful of this should be poured into a shallow glass or porcelain dish and applied with a toothbrush to the roots of the hair or locks which are to be dyed. After the application, step out into the sunlight for 10 minutes or so. This causes a brown or black permanent color to appear. In poor light, a pinkish color may appear, but this turns dark later. The solution should not be permitted to run down over the forehead—apply cold cream to prevent staining of skin—nor to drop on white surfaces or the floor, since they will be turned brown or black also. Wipe away at once any excess or splashes, or, better still, spread newspapers around. Some persons prefer to dye only a small part at a time and then step out into the sunlight. Rubber gloves should be worn to keep from staining the hands. The dye is non-irritating, looks like clear water, and in this small amount is non-poisonous. Its use once a month is often enough.

Hair removers, or depilatories, are always dangerous to use, particularly under the arms. It is much safer to shave off the hair or to have it removed by a skin specialist. The danger of depilatories lies in starting an infection. One of my girl pupils in the University lost her life a few years ago from an infection following the use of one of the sulphide pastes applied under the arm. I know of several similar instances.

Persons with moles and particularly hairy moles should watch them for any signs of growing or spreading or getting sore, when they should be removed at once to prevent cancer starting from them. Even a child or young person may die from this cause, as occurred in an 18-year-old girl friend of my family who was "treated" by her brother-in-law, "a spinal adjuster" for several months until it was too late to save her life.

Baldness.—Baldness is usually hereditary. Even the same type of baldness occurs in father and son, or brothers and sisters. In some it starts about the temples and travels backward and upward. In others it begins as a round spot near the back of the head and spreads forwards and sidewards. It is due to dying out of the roots of the hair. It is often caused by the

same things that produce dandruff. It is also prevented by the same methods (see p. 90). Where it is strictly hereditary, there is little hope of preventing it. As one grows older, the hair naturally becomes thinner. Baldness following fevers is usually recovered from. When it occurs in spots, it may be due to parasites, ringworm, and occasionally syphilis and constitutional diseases. A skin specialist is often able to determine the cause and thereby stop the baldness, if not to restore the hair.

There is no known remedy or hair tonic which will restore hair when the roots have died. Certain foods containing sulphur are said to help the scalp and the growth of the hair. These are whole wheat, eggs, milk, oatmeal, beans, peas, graham flour or bran, lean beef; also the new iodized salt and sea salt for table use are theoretically beneficial. For a dry scalp, rubbing with a mixture of one-third castor oil in alcohol is recommended. For a greasy scalp a shampoo of mild soap and water three times a week is recommended.

The lotion of resorcin, castor oil, and alcohol recommended for dandruff, to which 10 drops of balsam of Peru is added, is often beneficial. It should be rubbed into the scalp daily with a piece of flannel. Singeing the hair is a foolish procedure. There is also no evidence that frequent cutting of the hair makes it grow any faster, nor that cutting prevents its growing. Any alleged effects are due to the manipulating or massaging of the scalp which accompanies the cutting or singeing procedure.

Chapped Skin.—Chapping occurs as the result of cold weather, cold or hot solutions, or irritants on the skin. Putting the cold hands into hot water will crack or chap the skin at once. Any chemicals which dry the skin or abstract the normal greasiness will produce chapping. Among the commonest of these are gasoline, cleansing compounds, and alkalies.

The best remedy for chapping is to apply ordinary vaseline or borated vaseline overnight, wearing a pair of light cotton gloves if necessary to protect the bed clothing. The gloves also help to retain warmth and moisture which aids in the rapid healing which takes place. Lanolin or wool fat is also good. Vaseline or lanolin are better than cold creams and the usual lotions because they are thicker and last longer. The healing is done by the increased blood circulation which is brought about when the parts are protected from the air and kept warm, moist, and greased.

Hang nails, or the little skin tags which tear up around the nails of the fingers or toes, require care to prevent infection and even blood poisoning. They should be touched lightly with tincture of iodine. After that, if still sore, rub on a little borated vaseline.

Ingrowing toe nails likewise often become infected and the germs may travel up the leg, sometimes showing a red streak and causing blood poisoning. Ingrowing nails are due to tight, narrow, or short shoes. The toe nail should be scraped thin on the top with a piece of glass, the end should be clipped short, and the corners should be lifted out of the flesh and snipped off. Tincture of iodine, perhaps followed with a little borated vaseline may be applied. If getting bad, put on hot boric acid dressings (see p. 90). No cure can be expected until larger shoes are worn.

Corns and bunions are due to shoes which are too small or to rubbing of a poorly fitted shoe. Calluses on the sole of the foot are often due to walking (or standing) when one is not accustomed to it. None of these conditions would occur if no shoes were worn. Hence the first act is to get shoes large enough and better fitted to the foot. Correct position of the foot in walking and standing is also very important (see Flatfoot). Further remedy lies in removing the shoes as soon as one returns from work and, if necessary, wearing bedroom slippers, moccasins, or soft felt shoes.

Protect the corn or bunions from pressure of the shoe by using the customary ring-shaped felt pad or a strip of adhesive or salicylated plaster, or, apply a layer of compound salicylated collodion which, when evaporated, leaves a thin "skin" over the corn. Remove this layer night and morning, using the cleaned finger nail, not a knife, and each time put on a new layer. Within 3 to 6 days the corn will separate from the tissues below and come out. I have known a severe callus on the sole of the foot, nearly the size of a silver dollar, to soften and come out by this treatment in 2 weeks' time.

It is unsafe to use a razor on corns or bunions, because the least cut into the surrounding tissue may become infected with much danger of blood poisoning. However, should you cut yourself, apply tincture of iodine at once. As stated above, you can expect no permanent cure until proper shoes are worn.

Shaving is a common source of skin irritation. The danger here lies in small cuts, ingrown hairs, and improper treatment of

the face after shaving. As a rule, cuts in the beard area heal readily if let alone. By all means one should never touch them with the finger moistened in the mouth, for fear of infecting them with pus germs which are commonly found in the mouth. Ingrowing hairs are best treated by softening with vaseline at night and removing the offending hair the next day. After shaving, never use anything but hot water and a towel. Bay rum, alcohol, various lotions, ointments, and powders are unnecessary and usually do more harm than good. Hot water brings a rich flow

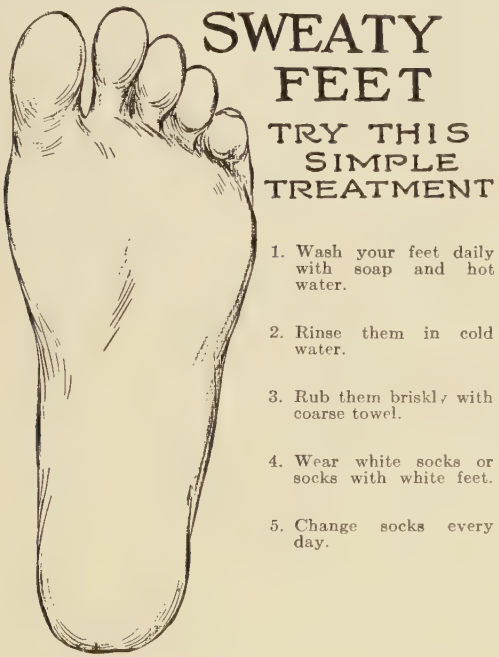

SWEATY FEET
TRY THIS SIMPLE TREATMENT
1. Wash your feet daily with soap and hot water.
2. Rinse them in cold water.
3. Rub them briskly with coarse towel.
4. Wear white socks or socks with white feet.
5. Change socks every day.

FIG. 22.—Rules for the prevention of sweaty feet. (*Courtesy National Safety Council*, with modifications.)

of blood to the shaved area which promptly takes care of slight cuts, close shaving, etc. By this process also the skin soon becomes hardened and resistant to infections, and loses its tenderness. Pimples and skin eruptions commonly follow the use of almost anything else.

Perspiring feet are a great annoyance to many workers who have to stand a great deal or work in hot places. They are seldom the cause of ill health. Wear larger shoes, take the shoes off as soon as you arrive at home, soak the feet for 15 minutes

night and morning for a few days in lukewarm or cold water to which you have added a little powdered (burnt) alum. Massage the feet and go barefoot when possible. These precautions all tend to harden the feet. Bad cases may lead to infections and so-called "trench-foot" as occurred among soldiers in the late war.

A powder composed of starch, 90 per cent, salicylic acid, 5 per cent, and boric acid, 5 per cent is helpful. A 1 per cent solution of formaldehyde is recommended for two or three applications only. I have known a single application of tincture of iodine about the toes to stop very foul odors which are sometimes associated with perspiring feet. Never use tincture of iodine more than once on the feet and preferably not more than twice anywhere else for anything. It tends to cause blistering or drying up and cracking when used several times. Should such occur, cover over well with borated vaseline.

Injuries like cuts, scratches, bruises, and punctures of the skin should be discussed in a book on first aid. They are mentioned here simply to call attention to the very great importance of preventing infection. Even the smallest scratch or bruise should be attended to within half an hour, and sooner if possible. Your skin protects you from the rest of the world, and a puncture through it opens the way for germs to enter. Allow small cuts to bleed freely; don't wash with water, because you will only spread germs from the surface of the skin into the cut.

If dirt or grease has been rubbed into the wound, clean with gasoline, and when bleeding has practically stopped, swab with tincture of iodine. This has a triple value; the iodine is a disinfectant, it also promotes healing by increasing the blood supply to the wounded area, and it has a stimulating effect of a healing nature on the body itself because it appears within and stimulates the thyroid gland (discussed in Chap. XIII) within a few moments.

Wounds should next be protected from germs and further injury by covering with a small piece of gauze or clean cloth held on by an adhesive plaster. Never apply the plaster directly over the wound, because it fits too tightly and does not permit secretions to come out, which secretions often carry germs which previous treatments did not succeed in killing. Never apply a court plaster over a cut or wound for the same reason. Certainly it is very dangerous to moisten a piece of court plaster with the

tongue and then put it on a wound; you are only inviting infection. Should wounds become sore, red, or "matterated," seek medical aid at once.

In case of puncture wounds, particularly from rusty nails and also dirty slivers, or wounds made about barnyards, livery stables, on the street, in the garden, or around houses, lockjaw is to be feared. A physician should be consulted promptly, as the first-aid treatment often saves a life. Bad bruises should always be seen by a physician, as the smashed tissues have little resistance to blood poisoning, erysipelas, or lockjaw.

Burns.—Small burns should have their blisters punctured in two places by first covering the blister with tincture of iodine and then using a needle or small knife blade which has been sterilized by passing through the flame of a match. Leave the cover of the blister, that is the raised-up dead skin, in place in order to protect the tender skin beneath. Burns heal best when left exposed to the light and air, and not covered at all.

If likely to be further injured by working, cover with a piece of gauze held on by a strip of adhesive plaster. Larger burns may be bathed with 2.5 per cent tannic acid solution until stained, then exposed to the air, or smeared over with borated vaseline or carron oil (which is equal parts of linseed oil and lime-water) and then wrapped loosely in gauze bandages. But they should be treated by the physician. Occasionally infections, blood poisoning, erysipelas, and lockjaw follow burns. Such a complication usually starts with a soreness about the burn and possibly a chill. Don't attempt to treat such a complication yourself but get expert aid.

Leg Ulcers.—Ulcers on the shins are fairly common. Their immediate cause is an injury or repeated injuries. However, the fact that they do not heal in some persons and tend to get larger shows that there is some underlying condition present. Sometimes this condition is syphilis. More often it is due to varicose veins located in the leg above the level of the ulcer. These swollen veins which often show as knotty or worm-like figures beneath the skin, sometimes blue in color, cause the circulation of the blood to be too slow. This results in slow healing of any injuries to the skin. Varicose veins are discussed further in Chap. VIII. The skin is often hard, dark colored, and occasionally swollen below and around the ulcers. Great itching and eczema may also be present. Unless the ulcers are dressed

daily, they become foul smelling. It is practically useless for a person to try to cure leg ulcers without the aid of the physician or skin specialist. They are among our most obstinate diseases to treat. Every precaution should be taken to keep from bumping the shins or otherwise injuring the ulcers. For this reason special kinds of healing and protective dressings are required.

Ivy Poisoning.—Poison ivy, oak, and sumac may cause poisoning in many persons, especially workers on roads, railways, farms, etc. Touching the leaves, stems or bark, also getting the dust of the roadside onto the moist skin or even upon the clothing, and then handling the clothing afterward may start the poisoning. Some persons are very susceptible to these poisonous plants. Such plants should be destroyed wherever found. Even the susceptible person can prevent the poisoning from developing by washing the face and hands or perhaps bathing the whole body within an hour in plenty of soap and water. If trouble is to follow, it usually starts with an itching sensation about the face, backs of the hands, wrists, chest, thighs, and private parts within 24 hours. If the itching places are touched with 1 to 5 per cent formaldehyde solution (diluted in water), the itching usually stops at once and will not reappear for a matter of 2 or 3 hours. Upon reappearance, apply formaldehyde again. It is usually not advisable to continue this treatment more than four or five times because the formaldehyde dries and cracks the skin and starts an itching of itself.

Persons exposed to these plants are advised to carry a 2-ounce bottle of the formaldehyde solution with them. Apply it with the thumb or finger moistened with the solution the first time any itching is noticed. No bandages should be used. If this does not stop the eruption, which usually appears within a day or two, rub in some compound resorcin ointment (N.F.) obtainable from a drug store. Bad cases will demand medical aid.

Eczema and dermatitis may be considered together for our purpose, though dermatitis usually comes first, to be followed by eczema. Certain persons for unknown reasons are very susceptible, especially those who are anemic, run down, or suffering from a chronic disease. Drugs are often the cause. Among the local causes are a rubbing of the skin by rough clothing or bandages, exposure to heat, to sunburn, to cold (producing chilblains), itch mites, oils and greases, irritant dusts and liquids, and also to keeping the hands constantly in water. In the various stages

there are inflammation or reddening, itching, blistering, running of a watery secretion, drying with formation of scales, also cracking or fissuring, and later, if not stopped, thickening of the skin. There are no constitutional or inward symptoms, no scars or ulcers (except as might occur from violent scratching), while a tendency to spread rapidly and to come and go is characteristic. Every attempt to find the cause should be made. One may have to quit his occupation when this is the cause, but the use of gloves, frequent cleaning of the skin with mild soap and water, and covering it with equal parts of starch and zinc oxide powder before going to work may be tried; or, in place of the powder, an ointment composed of lanolin and castor oil, equal parts, which should be washed off at noon and at quitting time with soap and warm water.

Treatment is both constitutional and local. Cod liver oil, malt preparations, and tonics should be used by those under par in any way. The local treatment recommended for poison ivy should be tried when the trouble begins. When reddened, itching and *dry*, apply zinc oxide ointment or borated vaseline. When a *watery* discharge occurs, use the regulation "black wash" obtainable at the drug store composed of calomel, mucilage of tragacanth, glycerin, and limewater; apply several times daily for 15 to 20 minutes, perhaps using the zinc oxide ointment in between. Boric acid in saturated solution is also useful. A dusting powder may be more convenient for some to use, such as McCall Anderson's, composed of zinc oxide powder ½ ounce, powdered camphor 1½ drams, and starch 1 ounce. When there is much itching with but very little eruption, treat as for pruritis below. If the above prescriptions do not give prompt relief, also in all chronic cases, consult a physician or perhaps a skin specialist.

Pruritis.—A common skin trouble called "pruritis," which itches intensely but has no eruption or even redness, is due to some internal trouble or nervous disease and, while not threatening life, requires expert skill in determining its cause and prevention. It often occurs about the anus and genitals when piles or discharges are present. Washing with 2 or 3 per cent carbolic acid, or with very hot water often gives great relief.

In persons past middle life, any sore which fails to heal within 5 or 6 weeks' time may be a *cancer*. Occasionally a sore of this kind occurring on the lips or face or in the mouth is a hard *chancre*

—the beginning stage of syphilis—which the victim has accidentally acquired from some other person suffering with syphilis. Workers handling blow pipes, shuttles, needles, and similar objects passed from mouth to mouth are especially liable. Occasionally the chancre is gotten from the use of a pencil, teaspoon, cup, or towel used by a syphilitic person. An effort should be made to find who is spreading the disease and have him isolated and treated. Every effort should also be made to stop the common use of cups and towels and instruments such as those described. The diseases mentioned in this group require prompt and skilful treatment. Fortunately syphilis can now be cured and most skin cancers and "rodent" ulcers, which invariably become cancers, can be checked by the use of the X-ray or radium or by surgical removal (see Chap. XIV).

Other afflictions of the skin are usually beyond the skill of workers or laymen to take care of. Common ones are ringworm, "itch" or scabies, and contagious sores (impetigo). All of these should be taken to the physician.

Our Dangerous Fingers.—Before closing this chapter the writer should issue a word of warning about keeping the hands away from the nose and mouth, particularly when you have just shaken hands or touched someone else. You may easily spread disease from the other person to yourself. Usually such transfer has to take place within a few minutes or while the moisture of the other person's hands or skin remains upon your own hands. It is therefore a hygienic habit to wash the hands before eating and after going to the toilet.

Also, because we have the habit of putting our hands and fingers to the mouth, nose, and eyes quite unconsciously, it is well to wash them frequently during the day. Here is one distinct example of washing as a prevention of disease, it keeps one from transferring germs or poisons, which get on the hands, to the mouth, nose, and eyes.

CHAPTER VII

THE BREATHING SYSTEM

All animal and plant life whether in the water, in the ground, or in the air *breathes in* oxygen and *gives off* carbon dioxide. So far as water animals and plants are concerned, the oxygen is dissolved in the water from which they must extract it in order to live. This is true for those composed of single cells, as well as for many-celled animals like man. While plants breathe the same as animals, they have a particular process which must not be confused with this normal breathing process, *i.e.*, they also take in, proportionately, very large quantities of carbon dioxide and break it up so as to turn loose the oxygen to the air while keeping the carbon for their own tissues. Much of the carbon they turn into gum, rosin, cellulose, starch, and sugar.

The Structure of the Nose.—The respiratory or breathing system in man is quite complicated. It begins with the nose and may be said to end with the lungs although each little cell in the body is connected with the lungs by means of the blood which continually flows between the one and the other. The nose has a number of hollow cavities connected with it through narrow openings. These cavities are called "sinuses." There is one sinus in each cheek bone, one or two in the forehead bone, several behind the bridge of the nose, and others. In the rear, the nose opens into the top of the throat where are also located the openings of two tubes (the Eustachian tubes), one on each side, leading to the right and left ear, respectively. In addition, the nose is connected with the inner corner of the eye by a tear duct so that, in crying, tears are discovered to run into the nose. Practically all of these ducts and cavities as well as the inside of the nose are lined with a peculiar mucous membrane which has waving projections, called "cilia." These cilia are microscopic in size, but capable of lifting and moving along particles of dust, germs, mucus, and foreign matter which may be inhaled or deposited upon the membrane. In the front part of the nose this movement is forward towards the outside, and, in the rear

part, backward into the throat where the material may be collected as soon as noticed and spit out. A great deal of mucous secretion helps this moving of objects along and also protects the membrane.

The purposes of the nose are numerous, such as warming and moistening the incoming air, filtering out and catching dust particles, bacteria, etc., and detecting of odors, which is one of

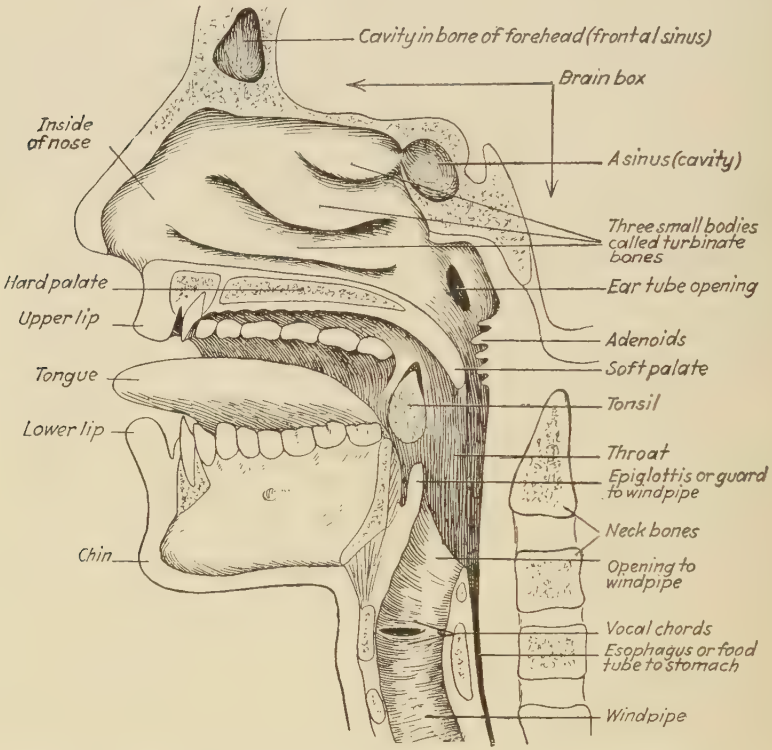


FIG. 23.—A diagram showing the inside of the nose, mouth, and throat.

Nature's methods of protecting us in the presence of poisonous or objectionable gases. The mucus in the nose also destroys many bacteria, and the tiny glands present may help to produce antitoxin and similar substances which are destructive to germs. The nose amplifies the voice, as can be quickly noticed if one's nose is blocked up. Considerable waste matter from the blood is passed in the secretions of the nose. High blood

pressure is often relieved by a nose bleed. Breathing through the nose produces a suction much greater than breathing through the mouth, which helps very much in getting the blood from all of the body to return to the chest and to the heart. The bridge of the nose helps to protect the eyes from injuries. Finally, one can be fed by a tube passed into the nose when, for some reason, the mouth cannot be opened or used.

The nose ceases to perform its full duties whenever blocking up occurs or whenever the little wavy projections of the mucous membrane (cilia) are benumbed by poisons, germ toxins, cold, drying, or sheer weight and mass of inhaled dust. Oftentimes, in fact, these cilia are destroyed, and although they usually grow back again in the course of a day or so, their protecting influence is gone in the meantime, so that dangerous germs have a chance to grow in the nose, causing colds and possibly severe diseases, or they break through into the tissues of the body. Even poisonous gases and dusts may enter the body through the lining membrane of the nose and the cavities connected with it.

Certain bad habits are very injurious to the nose. Probably the worst of these is permitting a blocked-up condition to remain over a period of time. This leads to a shriveling up and dying off of the cilia and even the lining membrane itself. On the other hand, anything which constantly irritates the inside of the nose, even its own secretions when they cannot flow out freely, causes a slow overgrowth of tissues which may block up the nose. Going from hot, dry rooms to the outdoors on a cold day often causes more of a shock to the tissues of the nose than they can stand, and in many persons, a bad cold follows. Also going from the cold outdoor air to the hot, dry inside air may do the same (aridity shock).

Turbinates.—The nose contains on each side three swell-bodies called "turbinates." On irritation of any kind these at first swell up, perhaps so large as to block up the nose. This is for protection again dangerous substances when inhaled. On the other hand these swell-bodies decrease in size under certain influences and permit more air to enter through the nose. The significance of this will be discussed presently.

Normal Conditions of the Nose.—We may know that the nose is normal in its functions and that it is in a good state of health when we are able to breathe easily through both sides; when, after clearing the nose, the breathing sounds alike on both

sides; when the ability to smell is unaffected; when the membrane is sensitive so that we sneeze easily if an irritating substance is inhaled; when the voice sounds normal, that is, when there is an absence of "nasal" voice; when we can go from cold into hot places, or from dry atmospheres into moist ones, without developing colds; and when the mucous membrane has a healthy pink color.

Abnormal Conditions.—On the other hand, the nose is usually abnormal in its functions or derelict in its duties when there is a discharge or "running nose," either from the nostrils in front or into the throat; when it is blocked up; when a ridge or spur can be seen on the middle partition, or septum, or when this partition seems to be too far to one side; and when anything can be easily seen hanging from the inside. There is, of course, something wrong when the sense of smell is lost; when the person experiences foul smells which are not noticeable to others; when "nasal" voice is present; when ulcers are present; when bleeding occurs; or when there is a hole or perforation through the middle position permitting air to pass from one side of the nose to the other, or a hole from the nose into the roof of the mouth. Sneezing is also a valuable warning that the person is catching cold or is inhaling some more or less dangerous gas or dust.

Women are more likely to suffer from colds, influenza, and tonsillitis than men, while men are more likely to have holes or "perforations" in the nose, due to breathing harmful dusts and gases and to the fact that syphilis is more common in men.

Colds.—The most common disease which mankind experiences is "cold in the nose," or coryza. While most often this is a disease by itself which runs a few days and stops, some dozen or more diseases such as measles, meningitis, influenza, pneumonia, etc. may begin in the same way. Furthermore the common cold is very apt to extend down the throat and into the lungs. Hence any cold in the head must be looked upon as something worth attending to at once. Colds in the head are usually due to one of four causes:

1. Contagious or communicable diseases, which have usually been caught by putting into the mouth something which has been mouthed by another person who has a cold, or by touching or kissing someone who has the germs, or even inhaling the coughed-out "droplets" or sneezes of some person who is carry-

ing the disease germs; therefore, the avoidance of crowding in all rooms or places where people congregate.

2. Faulty ventilation, like cold drafts or rooms which are too warm and too uniform in temperature, cold feet and "stuffy head," as occurs so often indoors where the head is in warmer air than the feet (the reverse of what is found out of doors); or sitting with the back to the fire or radiator, instead of the feet and legs.

3. Disease in the nose itself, such as adenoids, enlarged turbinates, polyps, and ulcers.

4. Any weakened or rundown conditions of the body from illness, lack of exercise, lack of good food, overeating, alcoholism, and indoor life away from sunlight and the invigorating influences of frequent outdoor "airing" with the hat and coat off, even in cold weather, which soon hardens one to colds.

Every cold in the nose should be looked upon as contagious. No harm will be done if a given cold is not found to be contagious. The individual with a cold should keep at least 5 feet away from other persons. When sneezing or coughing, he should always cover his nose and mouth with his hand or a handkerchief or a rag which can be burned; also, he should always eat from separate dishes so as not to spread his cold to others; his dishes should be scalded after eating.

The common cold can oftentimes be stopped if taken during the first few hours. First, try to discover the cause at once, such as an overly warm room, too much clothing, a draft, or chilling. Also rub the body vigorously, especially the place which seems cold or shivery. Next, take four or five deep breaths through the nose, preferably out of doors or where it is cool. When there is a burning or dry sensation, breathe through the mouth and exhale slowly through the nose for 15 minutes or so at a time. These steps alone will stop most colds. After one retires at night, colds make the most progress. When one is asleep, the nose blocks up and things go rapidly from bad to worse. If possible, never let the nose block up with its discharges. I believe an alarm clock set at every two hours to arouse one to awaken and blow out the nose would do much to keep colds from getting worse and perhaps to stop them altogether. A person may resort to further methods if the above are not successful: Inhale smelling salts, a whiff of ammonia, or of formaldehyde or of menthol, strong onion, garlic, or horse-

radish. Mentholated vaseline may be rubbed on the upper lip. The idea in all of these methods is to arouse the sluggish membranes lining the nose to a sense of duty and thus increase the blood supply to the nose, after which Nature will usually take care of the rest. If these efforts do not stop the cold within an hour or two (and each should only be tried once or twice), one may use an atomizer containing a warm baking-soda solution (⅓ teaspoonful to ½ glass of water); or ½ teaspoonful of salt and ½ teaspoonful of baking soda in a glass of warm water; or try one of the usual oily preparations. I do not feel disposed to recommend one above the other. The drug store preparation known as Liquor Antisepticus Alkalinus is good; also pine oil preparations, and also boric acid (saturated solution) with glycerin in equal parts. Seiler's tablets and Dobell's tablets obtainable from drug stores and dissolved in water according to directions are good for use in atomizers and also as gargles.

One should never snuff liquid up the nose nor pour drops into the nose for the reason that these may gather dangerous bacteria in one part of the nose and carry them to the sinuses or middle ears and elsewhere. An atomizer with a fine cloud-like discharge will not do this. A good atomizer can be obtained at a drug store for about one dollar. If used by several members of one family at one time, its tip should be carefully sterilized by dipping into alcohol or 5 per cent carbolic acid. Never squeeze the nose while blowing it, as this often forces clumps of bacteria and infected mucus into the openings of surrounding cavities and leads to their infection. Finally a warm bath, a hot drink, and a physic (see p. 46), followed by a rest in bed for a few hours, greatly assist in stopping a cold. Eat lightly instead of overeating. There is nothing to the old saying, "Feed a cold and starve a fever"; instead, eat according to your appetite, but eat simple nourishing foods, preferably warm.

Influenza seems to arise from crowding people inside of a building, as new recruits in a barrack. Influenza, except in epidemics, cannot be distinguished from grippe and even common cold at times. However, influenza and grippe begin suddenly; chilly feelings come early. One feels cold inside. One leg or part of the body seems cold in spite of extra clothing or warmth. Pain in the head, back of the eyes, sore eyeballs and shivering occur. Some fever is usually present. But most marked of anything is the "knock-out" or "all-in" tired feeling Yet one hates to give

up and go to bed. Slight cold and sore throat and cough may come on at once or later. Sometimes the bowels are affected. With the tired feeling is also mental gloominess. The weakness, mental depression, and irritability lasts several days or weeks, but the rest of the symptoms usually clear up in 3 or 4 days or pass into something worse, usually pneumonia. Few die from influenza but many from pneumonia. Therefore, give up work, stay in the house, keep away from others, and use separate dishes. Don't sneeze or cough in others' faces. Vaccines are often very helpful. Avoid chilling of the body. Keep the feet warm. Eat warm meals. Don't drink cold things. Take baking soda dissolved in warm water rather frequently. Avoid constipation. Medicines help very little but if pain or headache is severe, acetyl salicylic acid, called also aspirin (1 to 3 tablets of 5-grain size), may be taken every 3 hours or until the ears ring. But a rest in bed on a light diet works wonders (see also treatment for colds, p. 105).

The average person has about two colds a year. When the cold is associated with prostration or the person feels "knocked out" for a few days to a week or so following, we call it "the grippe." When this occurs in big epidemics, we call it the "flu" or "influenza." While grippe and influenza usually begin as a cold in the head and throat, they may begin in the bowels or nervous system. Only the general prevalence of the epidemic enables us to say that the attack is probably one of the grippe or "flu." Many persons, however, make the mistake of calling a sore throat or a beginning tonsillitis the grippe, or the flu. The terms should not be confused. One should always examine the throat and see if the "knock-out" is not due to trouble starting in the tonsils or throat rather than to the grippe (see p. 45).

Sometimes influenza or grippe affects one without showing any signs of a cold in the head or chest but the other symptoms are all present; usually in such cases the cold comes on 2 or 3 days later.

During a great epidemic of influenza, about one-third of the population will have it. We know that when people who are not used to each other's habits and mode of life are quickly crowded together, as when armies assemble, such gatherings increase the amount and severity of influenza, pneumonia, bronchitis, measles, meningitis, mumps, and common colds. There was no evidence, however, collected during the great influenza scourge of 1918 that

the closing up of public schools, churches, factories, etc., had any influence in stopping the epidemic, so that in the 1920 epidemic such measures were less often used. While, outside of preventing crowding, we know of no measures which prevent grippe and influenza, we are very certain that as soon as a person is attacked, he should separate himself from others, or others may be kept from taking these diseases by being sent away.

Many persons lost their lives in the 1918 epidemic who began to feel better on the third or fourth day and started to work again. A feeling of great mental depression accompanies and follows an attack of the flu, lasting sometimes for several weeks so that persons are very gloomy, irritable, "down in the mouth," and sometimes commit rash acts of violence, even suicide or homicide. Hence we should overlook trivial complaints and faultfindings in persons who have suffered recently from grippe or the "flu," and do all we can to cheer them up; never quarrel with them. We should always figure on this abnormal state of mind when we have the disease ourselves.

Catarrh refers to no particular disease but to a condition which is long lasting or keeps recurring and is associated with considerable discharge from the nose. There is little hope of stopping catarrh until the cause can be discovered. There are many causes for the condition. There is usually some deformity or infection or other disease in the nose. But sometimes the condition is due to trouble elsewhere in the body; sometimes to the daily breathing of obnoxious dusts or fumes; sometimes, to bad ventilation conditions, or to wearing too many clothes. The sufferer from catarrh had best seek the aid of the physician or of the health officer. The physician may find it necessary to refer you to a nose specialist.

As practically all diseases of the nose are shown either by a cold or by catarrh, the signs of which have already been given and the causes of which are very numerous, I strongly suggest that the individual sufferer go no further in treating himself than the methods which I have indicated. If these do not bring relief, if the cold does not cease of itself, get outside aid. Be very careful to bundle up warm and not to get the feet wet or otherwise expose yourself during or after a cold as a relapse or perhaps a serious complication may result. Whenever there is any prostration, weak feeling, chills, feeling of fever, or pain and headache, an infection has almost certainly started which should be stopped

if possible before sinus trouble, pneumonia, meningitis, etc. set in.

Hay fever is usually due to inhaling the pollen from common weeds, certain plants, flowers, trees, and occasionally from particles given off by animal hair (horses, etc.) and feathers. A large amount of hay fever can be prevented if the common weeds and grass are kept cut down within 10 inches of the gound for the space of an ordinary city block around you. On windy days

(*Lea and Febiger*)

FIG. 24.—The common ragweed is the chief cause of hay fever. (*Dr. I. Chandler Walker in Hygeia.*)

pollen is carried farther and some persons get great relief by wearing a nose mask or respirator. Usually the sufferer from hay fever has some deformity or disease in the nose which requires correcting before much hope of permanent cure can be brought about. Certain tests can also be made by physicians who specialize in vaccines to find out just which pollen or dust the victim is subject to, so that a special preparation or vaccine, usually given in the form of injections, can be used to bring about immu-

nity or freedom from the attacks of hay fever. The same holds true also for asthma, *i.e.*, when this is not due to heart disease or some other diseased organ. The U. S. Public Health Service, Washington, D. C., can supply you with some valuable literature on the subject of hay fever. Also your state or city department of health may be able to do so.

Adenoids.—Since adenoids involve children rather than adults, they are mentioned here simply to state that they should invariably be removed when they show any signs of blocking up the nose or interfering with correct breathing. They are then

FIG. 25.—A paint sprayer using proper precautions. (*Courtesy Mine Safety Appliances Company.*)

infected with disease germs and commonly cause earache, infections of the ears, sore throat, bronchitis, and even lung diseases. They interfere with the normal growth of the face, jaws, and teeth, and cause children to be backward in school, *i.e.*, dullards. Their effects often extend into adult life, deforming the teeth and misshaping the face.

Occupational Diseases.—Certain occupations produce conditions injurious to the nose. Dusts like soda ash, lye, chrome salts, arsenic, mercury, and others injure the lining membranes. Grinding, polishing, and buffing produce damaging dusts. So also do fur and textiles. Ulcers may follow which often bleed. Later, holes may be eaten out by these dusts, either through the

partition between the two halves of the nose or into the roof of the mouth. It has lately been shown also that lead poisoning can be gotten even if the dust goes no farther than the nose, because it can be absorbed into the system from there.

Laryngitis.—The voice box, or larynx, stands at the upper end of the wind pipe. In man, its outside is known as the "Adam's apple." It is subject to catching cold which it usually gets from the nose or throat, although laryngitis may start in this voice box itself. A hoarse voice and perhaps a loss of voice is the chief sign. Inhaling steam or moist air with the vapors of compound tincture of benzoin in it (a teaspoonful to a teakettle of hot water) is very beneficial. Cold applications to the front of the neck for a few minutes at a time are very helpful. Should any difficulty in breathing occur, or fever, or chills, diphtheria may be present. Sometimes diphtheria may be present for several days in a man's throat with hoarseness as the only sign except that he feels sluggish and gradually more and more weak. Any such condition demands high-class medical aid at once. All persons with laryngitis or even hoarseness should keep separate from others until it is known what is present. Since diphtheria can now be cured by antitoxin within a few hours to a day's time if treated promptly at the beginning of the disease, it is the only safe and positive remedy. Within the last few years a test for liability to diphtheria, the Schick test, and a method of making one "immune," that is, of overcoming liability to the disease, known as the "toxin-antitoxin" treatment, have both been discovered. They should be applied to all infants and school children. Infants from 6 months of age up and all young children do not need to be Schick tested, since they are practically all liable to get diphtheria, but they should be "immunized" on the first opportunity by taking them to the physician, health officer, or school doctor. Three simple injections with a hypodermic needle, one each week for 3 weeks, is all that is needed. It then takes about 6 months before immunity is firmly established. Hundreds of thousands of children and also many adults have now been immunized to diphtheria by this toxin-antitoxin treatment. As the result of these discoveries, diphtheria is markedly decreasing in large cities like New York, and there is high hope that this disease may eventually be wiped out everywhere. All should give every assistance to health authorities and physicians in promoting this great discovery.

Other serious diseases of the voice box result from the breathing of dust, gases, or fumes; from syphilis, tuberculosis, and cancer. Any one of these should be attended to promptly, as allowing things to run on for even a few weeks often results in a hopeless outlook.

The spitting habit has two dangers: It may mean disease of the nose, throat, or lungs of the spitter; and the spit may spread disease to others. Spitting is, strictly speaking, not natural. It occurs in smokers and chewers. It also occurs with most colds and other diseases of the breathing system. By this means germs are spread perhaps directly onto others' shoes, clothing, or hands, or by flies and other insects to food, milk, etc. Spit is a waste matter and should not be swallowed. "Don't Spit" signs may be all right in street cars and public places, but cuspidors should be provided in all shops and work places where chewers, smokers, or "spitters" exist.

The lungs are the largest organs in the body. They occupy most of the chest. They are a mass of orderly arranged air cells and air ducts connected to the windpipe and to millions of small blood vessels so that air may be exchanged to and from the lungs for the benefit of all parts of the body. The total area of the breathing surface of the air cells and small air ducts is said to be 100 times the area of a person's skin. The lungs are covered by a smooth membrane called the "pleura" which allows them to move against the chest walls which are likewise lined with a smooth pleura. This motion is done without friction unless pleurisy is present, when both pain and friction occur. A chain of "lymph glands" passes up and down the windpipe from the angles of the jaws to the roots of the lungs. Those in the neck, when swollen and diseased, can easily be felt. This shows the easy connection between diseases of the tonsils and teeth, and diseases of the chest and lungs without considering the transference of germs by air down the windpipe.

The purposes or functions of the lungs are to carry the oxygen in the air to the blood, to remove the carbon dioxide in the blood from the body, and to exhale a considerable amount of water vapor and heat as well as traces of waste matter. The expanding and contraction of the lungs greatly assists the heart in moving the blood along, also the digestive organs in their movements, and even in emptying the bowels and during urination. They

also furnish the air blast for coughing and sneezing as well as taking part in labor pains during childbirth.

One of our common faulty habits is failure to keep up the expanding powers of the chest by deep breathing or by hard work, running, etc., several times each day. Hence the chest tends to become fixed and sometimes flat or sunken, the muscles weak, and the back to become round shouldered. All of these are harmful to the health of the lungs.

Signs of healthy lungs are these: (1) the ability to expand the chest at least 2 inches (in adults); (2) to register a good mark on a "spirometer" (an instrument commonly found in gymnasiums and medical clinics); and (3) the ability to hold the breath for 40 seconds or longer, especially if the "giving up" is due to a feeling of bursting and not to a feeling of dizziness or blindness. The physician uses a number of other methods which are too technical for discussion here. The ability to hold the breath for a fitting length of time measures not only the healthy state of the lungs but of the heart, kidneys, and in fact practically all of the vital organs. Persons, even when out of practice, who cannot hold the breath for 20 seconds are in need of medical examination. On the other hand, with practice, divers and others are said to hold the breath for 150 to 180 seconds, even while vigorously swimming or working under water.

Signs of disease of the lungs are, in general, coughing, spitting up phlegm every day, shortness of breath, pains in and about the chest, fever, weakness or easy tiredness, a rapid pulse, sometimes blueness of the lips, and loss of appetite and weight. While most children are born with a normal-shaped chest, because of incorrect feeding and various diseases, many grow up with flat chests which strongly predisposes to consumption (tuberculosis of the lungs) and to misshapen chests with little expansion possibilities. Older persons tend to develop the barrel-shaped chest which looks larger than normal but does not expand to any extent upon breathing. Proper food, physical education, and proper rearing during childhood will prevent most of these defects.

Anthracosis.—A very common lung disease of workers is anthracosis, or the breathing of coal dust and soot. The lungs are gradually rendered black from this cause. Outside of shortness of breath and predisposition to other diseases, anthracosis is not serious in itself, but pneumonia is a frequent complication and often fatal. When dust contains silica, that is, quartz dust,

sand dust, granite dust, emery dust, and other hard dusts, a permanent hardening of the lungs is gradually brought about. There may be very little coughing while this is going on but, after a couple of years or so, the worker finds he is gradually getting short of breath, somewhat thinner, a little weaker, and subject to dry cough or bronchitis. This is a very serious condition, and workers should do all they can to prevent breathing this form of dust. Consumption is the disease which almost always follows in the course of time. Remember that it is always the fine dust, whatever the character, which is breathed in the easiest and which does the most damage. Usually it is the dust which is too fine to be seen except in the path of a ray of light. While our lungs are wonderfully capacitated for handling an unusual amount of ordinary dust by collecting it in its secretions to be coughed out, these quartz and other silica dusts are a contradiction to the rule and become fixed in the lung tissues. Here they act as poisons, eventually inviting other disease, especially tuberculosis.

Pneumonia is the "old man's friend" because it deals the death blow so gently to the aged person, but it puts up a vicious battle with the vigorous adult whether death follows or not. One can prevent most bronchitis, pneumonia, pleurisy, and even consumption by keeping the body hardened by frequent short exposures out of doors to the light and air; also by having a physical examination at times, by close attention to correct ventilation and dressing, to correct food and good habits, and to the subject of fatigue, which is described in the following chapter. Cold, damp atmospheres and climates greatly favor pneumonia. Any sudden debilitating or weakening influence favors pneumonia. Men have it about four times as much as women. Those who have had one attack are more liable to another. Those who live indoors are more liable to it than those who work out of doors. Bankers and coal miners suffer most; farmers and lumbermen least. Sometimes several persons have it, all in one household, showing that it probably spreads from one to another. Among the atmospheric conditions which lead to lung diseases are the breathing of dust, (described in the preceding paragraph), poisonous fumes and gases and, without doubt, the breathing of smoky atmospheres and of combustion products from leaky stoves, salamanders, faulty fireplaces, and gas stoves. Gas stoves should always have stove pipes or vents to lead off the fumes from the inside of the room. In this matter of smoke and

combustion products, it is well to point out that a city like Pittsburgh has almost twice the death rate from pneumonia of Cleveland and over three times as much as San Francisco. Pneumonia is much more common in cities than in the country; also more frequent in colored people. Severe chilling of the body, wearing too much clothing indoors, colds in the head and alcoholism stand out as preeminent causes of pneumonia. Many contagious diseases also end up with pneumonia. Even after colds, influenza, or pneumonia start, certain vaccines are sometimes very prompt in stopping them. Don't try to treat a bad cold, influenza, or pneumonia yourself. See a doctor promptly.

Consumption, or tuberculosis of the lungs, is a decreasing disease in the United States but still causes from 7 to 10 per cent of all deaths. About 95 per cent of all adults have the germ of this disease in the body, but fortunately only about 2 per cent are actually in danger and 1 per cent actually have consumption. This means that there are about 2,000,000 people in the country within the battle zone. For every death from consumption there are known to be about 10 active cases of the disease occurring each year. The disease causes 85 to 90 deaths a year for every 100,000 of the population. This rate is dropping, for the country at large, by about 3 deaths each year, from which it would appear that the disease may become rare in about 30 to 50 years from the present time. It is, however, *the* great disease of the working man and woman. It is by far the commonest cause of death between 20 and 40 years of age and stands close to the top for all ages.

Tuberculosis is spread from one person to another by touching, kissing, etc., and upon things like dishes, towels, pencils, etc., but it is not considered contagious. This is because it requires considerable lowered resistance of the person as well as repeated exposure to or "bombardment" by the germs to land enough of the germs in a person to start the disease and keep it going. Hence it is communicable, but not contagious because mere contact with a consumptive person once or twice will usually not start it.

The chief things which spread tuberculosis are: the sputum which the consumptive person coughs up and spits around; the milk from tuberculous cattle (therefore milk which does not come from tuberculin-tested herds should always be pasteurized, because this kills disease germs of all kind); and objects such as toys, toilet articles, dishes, and perhaps pet animals.

Tuberculosis is almost always acquired in childhood before 5 years of age. Children get it from living with parents or others in the household who have consumption. Playing on floors, pavements, carpets, sofas, and perhaps sleeping in bedclothes used by consumptive persons spread the germs. Many children die of the disease before they are 5 years old, usually in the form of broncho-pneumonia. In many it causes tonsillitis, enlargement of glands in the neck and chest, and oftentimes tuberculosis in the joints, bones, and intestines. Most humpbacks, stiff joints, and shortened limbs have been caused by this disease.

After children survive to 5 or 6 years of age, they usually succeed in "burying" the disease, so to speak, in the lungs and elsewhere, where it lies dormant until faulty habits in later life break down the normal resistance and it starts up again as "consumption." This begins to show as early as from 12 to 20 years of age and any time afterwards. It is questionable whether adults ever "catch consumption"; they already have the germs in the system and it is the breaking out of these which happens, instead of "catching" the disease anew.

Cause of Tuberculosis.—The direct cause of tuberculosis is a vegetable parasite known as the bacillus of tuberculosis. It is very common in many animals as well as man, but most animals and man are not affected by it to any extent. Domestic animals such as the cow, horse, sheep, and chickens may develop consumption when kept indoors too much, and it easily spreads from one animal to another.

The important thing is a knowledge of the factors which predispose to consumption. The race to which one belongs is important. The most susceptible is the Negro, then the Indian, then the Irish, especially those in America, then the Scandinavians, the Teutons (Germans, etc.), and Anglo Saxons (English, etc.). Russians and people from southern European countries and gypsies are more resistant, while the Jew is said to be the most resistant of all. The disease occurs especially in certain families and among relatives of consumptive persons. However, the disease is not hereditary. A child is practically never born with it, but soon after birth, catches the disease from its parents or relatives who have it. Therefore in Denmark and Norway, for example, institutions exist to which babies born in consumptive families may be taken and kept separate from their diseased mothers and fathers for the first several years of life, with the

result that they do not develop consumption later on. The question of whether there is a tendency to it in certain families cannot be answered. Perhaps a heart and blood vessels which are a little too small for the size of the individual predispose to the disease.

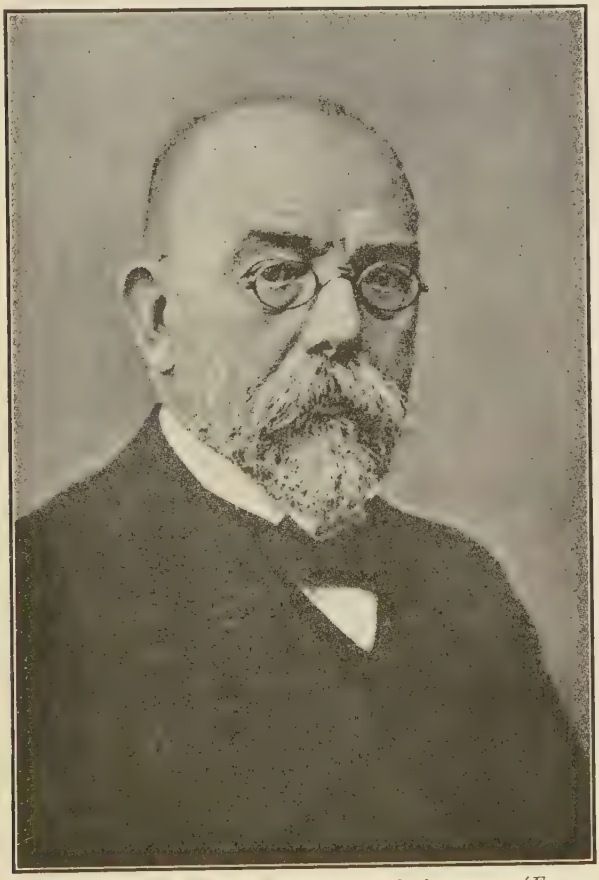


FIG. 26.—Robert Koch, discoverer of the tuberculosis germ. (*Esmond R. Long in Hygeia.*)

Dr. Van Ingen says that 4 per cent of New York City children have active tuberculosis, as against 1 per cent of adults, and in children it is always shown by malnutrition, that is, underweight and thinness. The tuberculosis of children from 5 to 15 years of age is in the lymph glands up and down the neck and alongside the windpipe into the chest, rather than in the lungs. Irregular

fever spells in children, perhaps coming on weeks or months apart and lasting only a day or so at a time, point strongly toward tuberculosis. A chief culprit in spreading the disease to children is the person who has consumption but thinks he is well, or only slightly sick. Many such persons, called "carriers," have the germs in their sputum which they scatter about by sneezing, coughing, using dishes, etc., and by handling children. Children have many opportunities for infection. Many times families have had consumption brought into the household by sick relations or friends who have come to live with them. Under such circumstances, send for a physician to settle the matter.

When one reaches early adult age, the reason that the infection begins anew, that is, that consumption starts, is the result of a loss of resistance. Apparently many things in our habits, especially when we are young people, bring about a loss of resistance to this disease. Failure to get enough sleep, long hours of work or pleasure, staying indoors away from the sunlight, breathing foul air, and living or working in overheated rooms, smoking, especially getting drunk, breathing toxic gases, breathing dust, and getting chilled are all factors which reduce one's resistance to this disease. In addition, physical defects which should have been corrected during early school life, such as bad teeth, tonsils, ear troubles, and adenoids, bring on an increasing liability to consumption. Having certain diseases often does so; among these are measles, whooping cough, influenza, common colds, pleurisy, bronchitis, and pneumonia. Those who have had typhoid fever are doubly liable to have consumption. Those who suffer from dysentery, malaria, hookworm disease, syphilis, anemia, and wasting disease of any kind are apt to develop consumption. The insane as well as the simple-minded have a special tendency to the disease, probably because they give so little attention to personal health and good habits.

While hard work should harden a person, it always damages one who has an infectious disease or any inflammation. The consumptive person is therefore directly damaged by hard work or strains of any kind. Those who have a tendency to colds in the chest or are delicate in any way should not engage in athletics any more than in hard work. It is a mistake to think that physical exercises, long hikes, and athletic games will build up a delicate or thin youth or girl or adult into a strong and vigorous individual. It is a grave mistake to engage in athletic events

for a week or more after any acute illness, tonsillitis, etc., and especially where a fever has been present. One then needs rest, careful nourishment, full exposure to sunshine, fresh air, and only such exercise as is found not to produce the slightest fatigue, or any rise in the temperature of the body. By this slow and careful method the more delicate or recently sick individual may be gradually built up while keeping his consumption, or other illness, in check. We call such controlled cases of consumption "arrested cases." These are the principles which one learns when he goes to a sanitarium for treatment of tuberculosis.

Remember that for all diseases, including consumption, wherever an inflammation or fever is present, rest is what is wanted and not exercise or strains of any kind. Exercise is all right for those who are healthy; it tends to create more health, vigor, and physical resistance, but it is bad for those who have disease or who have certain physical defects. Before undertaking a course of home exercises or gymnasium work or athletics, a person should have a careful physical examination to see that he may not actually damage himself (or herself) and perhaps reawaken an otherwise "arrested" case of consumption, or some other disease.

Certain occupations are notoriously associated with consumption. Strangely enough, among these are stenography, bookkeeping, and clerical work, telephone operator's work and school teaching. It is not because these occupations by themselves are unhealthful but invariably because delicate and unhealthy people, who do not feel able to do more vigorous work, take up these occupations. Therefore, let the delicate person consider well before undertaking indoor work. On the other hand, outdoor work which exposes to the weather may be just as risky. Such a person should first get some solid advice, including a physical examination, and should be carefully watched by medical supervision until certain that health is not being sacrificed to some job. Healthy people can withstand all sorts of strains, risks, and weather exposures even when not used to it, but such is not the case for those who are predisposed to sickness in any way. Next to the occupations just mentioned come those occupations which expose one to dust, hot places, hard work, damp or steamy work, and, finally, indoor work in general. Especially should one avoid the combination of a slightly overheated atmosphere which is also stagnant and "stuffy."

There is considerable difference between the sexes in regard to consumption. Girls and young women between 16 and 30 are especially liable to the disease, much more so than young men. Recent figures show that between 15 and 19, 140 girls die from consumption to only 87 boys. Also, consumption is decreasing in boys and young men from 15 to 30 while it is stationary or only slightly decreasing in young women at this period of life. From 30 to 45 years of age, men show more deaths from consumption than women. This is probably due to the fact that a

FIG. 27.—Many a middle-aged working person, like the man pictured here, is suffering from chronic tuberculosis (consumption).

large per cent of women have ceased work and are married and in the home after 30 years of age, while the influences of bad habits and certain kinds of work have finally broken down the resistance of the more vigorous male sex.

After 45 years of age consumption is about as frequent in women as in men, and is a very common disease throughout the rest of life. Indoor dwellers as those in monasteries, nunneries, and cloisters have shown a very high consumption rate. The ambitious individual also must look carefully to his health and life as respects this disease. Both the virtuous and vicious suc-

cumb to tuberculosis. Also the toxins generated by the germs of tuberculosis appear to stimulate one's ambition, to make one more active and bright mentally, so that a so-called "vicious circle" is set up which helps the disease along. Persons who are vivacious and bright as the day moves along but who are depressed, weak, and "all in" in the morning would do well to see that they are not suffering from consumption.

The question of money or economic position in the world has a very direct relation to this disease. When wages are good and there is plenty of work, consumption usually decreases. When wages are low and poverty exists, consumption invariably increases. Hence strikes, lockouts, etc., directly contribute to consumption as well as to other diseases.

Climate is no factor in causing consumption, provided delicate persons take reasonable precaution regarding exposure and getting the feet cold and the clothing wet. Apparently man lives in good health in any part of the world. This precaution, however, is noteworthy, that in changing from one climate to another or in going to a higher altitude, one should take things easy for 2 or 3 weeks until accustomed to the changes in temperature, moisture, sunshine, winds, and other local conditions. Formerly, consumption did not exist in Iceland and the Hebrides Islands. Neither was it present in the South Sea Islands nor in the Indians of Southwestern United States.

Recently the U. S. Public Health Service examined Indian school children at Taos, N. M., an isolated place, and found only 3 of 64 who gave a positive tuberculin test, a method of testing for tuberculosis in children and also in cattle, but in 1,145 Indian school children in the regular schools of New Mexico, 779 gave a positive test for the presence of tuberculosis.

High altitudes do not prevent tuberculosis. The Swiss watchmakers in the high Alps have had a high rate from this disease. In other words, what you do and the exposures to the disease count much more than the climate or place in which you live.

I have indicated above the underlying things which predispose to consumption, and at the same time I have indicated the principles for preventing the tuberculosis (which we practically all have) from turning into consumption, or the "being consumed" by these little vegetable parasites. A word should now be said concerning the early treatment of consumption because most people really have the disease well started before they realize it,

or believe it, and think of preventing it. The following list gives the accepted principles of controlling the disease:

1. Separate the suspected person from others in the family or at the work place; if possible send him to a hospital, sanatorium, or health colony. The family physician should be consulted about all of this. Since consumption is a pauperizing disease, the government as well as philanthropical agencies have set up special dispensaries and clinics with free medical supervision, visiting

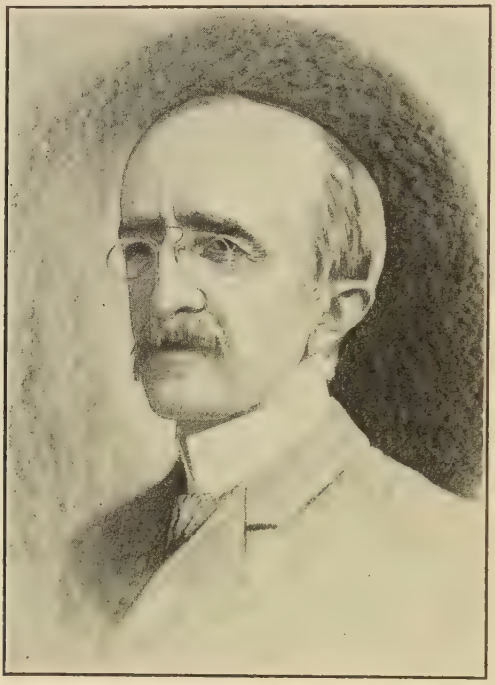


FIG. 28.—Edward L. Trudeau, discoverer of the value of fresh-air treatment for tuberculosis. (*Courtesy Metropolitan Life Insurance Co.*)

nursing, etc., for meeting the situation for those without funds. Write to your state board of health or call upon your local health officer.

Never leave your home town and friends "for the west," for the mountains, or other reputed healthful places to cure consumption, unless you have plenty of money. The advantages which any climate or altitude offer are slight compared to having no money or friends when you get there. Remember also that

the inhabitants of these places are swamped with the care of helpless and dying consumptives, and that it is almost impossible to secure any work for self-support after you get there. It is now proved that consumption may be cured in any town in the United States.

2. If you are inclined to the disease, find out all you can about it by reading matter obtained from your local health department. Pay no attention to advertised matter concerning cures or remedies. As yet there is no medical cure for this disease, neither is there any vaccine, although injections with tuberculin have

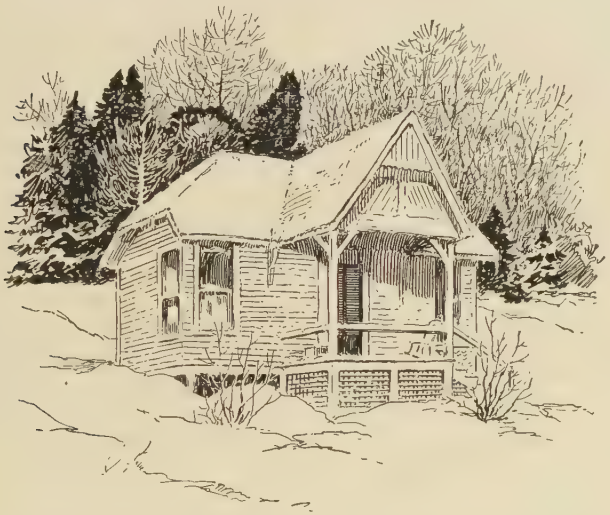


FIG. 29.—The first cottage for the open-air treatment of tuberculosis was set up by Trudeau at Saranac Lake, N. Y., in 1885. (*Courtesy Metropolitan Life Insurance Company*, with modifications.)

some benefit in some persons. Others, however, are made worse. Especially, learn how to take care of spitting and the use of dishware and washing and drinking places in order to keep others from catching the disease from you and to keep from reinfecting yourself.

3. Stand squarely behind all reasonable measures for sanitation in factories, schools, public places, and homes. It is foolish to give up sanitation and hygiene for higher wages. I know of several instances where a labor organization has been given the choice of better wages or better sanitary conditions and have accepted the former. To my mind this is a foolish decision

because sickness rates and death were high in the trades concerned and cost the workers many times more than the little additional wage which they chose to accept.

4. Start treatment for consumption at once. While it is a slow-going disease for most persons, it is a galloping disease for others, and no one can tell when a sudden turn for the worse, or pneumonia, may set in and cause death.

5. Encourage fresh-air schools and school lunches for your children. Remember that milk is a great resistance builder for all persons and especially children. Likewise children and others must have some fats in their food. Cod-liver oil is almost a certain preventive and a great help in curing the disease.

6. Lead a hygienic rather than an athletic life.

7. Don't stint on the food question. It has been my observation that many persons, especially girls and women, when out of work or on low wages or ambitious to buy something, will actually starve themselves in order to keep up appearances. They will put it upon their backs instead of in their stomachs. Going without breakfast or without some meal during the day is certainly a foolish procedure for a delicate or sickly inclined person, as well as for others in general.

8. Physical examinations are bound to find consumption earlier and to get it stopped; hence, encourage this method by your organized effort wherever you can. It should be a part of your plan of life.

You should suspect consumption when you have a tendency to colds in the chest, when you keep clearing the throat or hemming or coughing a little, whether you spit up anything or not. Usually you will spit up something on arising in the morning. It is, of course, natural to clear the throat in the morning but not much during the daytime. Remember, coughing or even spitting are abnormal. You should also suspect some stir-up by this disease germ if you have night sweats (which usually occur before daybreak), if you have chills over a period of time, if there are slight pains in the chest, if your appetite is poor, and particularly if it stops almost as soon as you sit down to eat. There is usually a slow loss in weight and a feeling of weakness, especially in the mornings, and also poor and irregular sleep. You tend to feel hot in the evenings but cold and chilly in the morning. As the afternoon and evening go on, your color gets better but you are quite pale in the morning.

While I do not believe in causing persons to worry about themselves, I believe the taking of the temperature with the thermometer in the mouth once every 4 hours during the day and evening should be done by one who fears anything is wrong. The temperature found should be written down and if, after 3 or 4 days' recording, you find the temperature rising above 99.5 or falling below 97, certainly consult a physician, or go to a dispensary and show the temperature figures which you have taken. The pulse is always increased in tuberculosis, and if the rate is found to be 90 or above while you are sitting at rest, it is possibly abnormal and may be due to consumption. For men, an increase above 80 is something to be suspicious about, provided mental excitement can be excluded.

Pleurisy is practically never a disease by itself. It is usually associated with consumption or pneumonia. Sometimes it is due to an injury of the chest and perhaps to pressing tools or objects tightly against the chest for periods of time. Pleurisy is often confused with neuralgia and neuritis of the nerves which lie along the ribs. Sometimes disease of the spine is present. It will take a careful examination to determine whether pleurisy or something else is present and also the extent of the trouble. Too often, the pains disappear and the person thinks he is getting well, except that he feels weak, coughs a little, and has no appetite. When this occurs, water (lymph) is accumulating in the chest, or some other complication equally as bad.

Asthma is of two kinds. The first to be considered is that form which comes on in attacks in persons who are apparently healthy otherwise. This form is almost always due to some food, dust, pollen, or germ infection to which the individual is very susceptible. Modern medicine with the aid of the laboratory is able to find the cause in the large majority of cases. It will be seen that, in this form, asthma has about the same causes as hay fever (see p. 109). Medical treatment, at least for immediate relief, is very successful as a rule. The second form of asthma is that due to diseases of vital organs such as the lungs, heart, kidneys, and bowels. In this form the person is not really well any of the time. There is usually a shortness of breath present, especially on a little exercise or extra effort. Old people have this form as a sign of old age and decline. Both forms of asthma are characterized by spells of shortness of breath, coughing, a feeling of weight or "misery" in the chest, sometimes blue-

ness of the lips and usually a watery cough which does not seem to get down to the trouble and "cough it out." Sometimes naûsea and vomiting occur. The chronic forms show heart weakness and perhaps dropsy or swelling of the feet and ankles.

Ventilation.—The chapter on the Skin discussed ventilation and stated that ventilation is an affair of the skin rather than of the lungs. This is true in all respects except when the air is polluted by poisonous gases and fumes. I do not consider the ordinary air which becomes hot and close and even foul smelling, in a room full of people, as chemically dangerous so far as breathing processes are concerned and the using up of oxygen or the increasing of carbon dioxide. Such an atmosphere is unhealthful, as already stated, for physical reasons and not chemical ones. But where the air to be breathed contains poisonous gases, vapors, fumes, or mists as from spraying machines, the question of proper ventilation enters in.

There are two methods of meeting this condition: (1) Dilute the poisons in the air by admitting sufficient quantities of fresh air and keeping the air rapidly moving away by fans or ventilators, or (2) catch the offending gases at their point of origin by what we call "local exhaust systems" or "blowers" having hoods which cover the place where these gases or sprays are produced. The local exhaust method costs more but is much more efficient and safe. My general observations show that when the method of dilution is used, workers are invariably breathing amounts of poisons which are above the body's capabilities of handling; in other words, they are being slowly poisoned. It is also true, with the exception of the three poisons or poisonous conditions, carbon monoxide, carbon dioxide, and low percentage of oxygen, that man cannot become habituated or used to any poison. A certain amount of toleration or "standing for it" may occur, but this is at the expense of one's reserve capacity and resistance to disease.

To a certain degree, however, one may become used to small amounts of carbon monoxide, carbon dioxide, and atmospheres low in oxygen. Increased carbon dioxide with low oxygen is known as "black damp" in mines. This combination also occurs in wells, in silos (on the farm), in deep cellars, in the holds of grain vessels, in sugar refineries, in brewery vats, and a few other places. Asphyxiation results promptly when one cannot get enough oxygen to breathe. Shortness of breath means

shortness of oxygen. It is this instead of an increase of carbon dioxide or, indeed, carbon monoxide, which produces asphyxiation.

Normal air contains 21 per cent of oxygen. When this gas is crowded out by some other gas such as those mentioned, a lamp flame will go out at about 17 per cent. The normal person will notice a desire to breathe faster and more deeply at about 14 per cent, while 12 per cent and lower will cause real suffering if one is awake or conscious. By experience man has been able to acclimatize himself to remarkably low percentages of oxygen, as in climbing Mt. Everest to an altitude of 28,000 feet where the oxygen pressure represents a percentage of only 7 or 8 per cent of that at sea level. Others would promptly die in such situations. In fact one of the Mt. Everest expedition died when he developed a cold because of the extra strain in breathing.

Whether a gas is poisonous or not is well known by toxicologists, most physicians, and chemists. Not only this but the exact amount which it takes to cause poisoning is known, so that in questions of dispute all that is necessary is to have a chemist examine the air of the place and find out what gases and how much are present. Workers should insist that all of the poisons in a given trade be determined and that they be properly informed about them and conditions made such that poisonous amounts of any of them shall be kept out of the air. Better still, see if non-poisonous substitutes cannot be used. Frequent rest periods of 10 or 15 minutes out of each hour do much to reduce the effect of poisonous gases.

Finally, universal gas masks or work inside of cabinets may be used. Remember that masks to stop dust do not stop gases nor particles like paint, which evaporate after they land in the mask.

The most dangerous poisonous gases encountered in industry are lead tetraethyl, nitrobenzol, benzol, anilin, carbon monoxide, turpentine, wood alcohol, carbon bisulphide, hydrogen sulphide, various coal-tar products, various petroleum products (gasoline, benzine, naphtha), turpentine substitutes and thinners. To this list should be added those fumes and vapors which are nauseating although not necessarily poisonous, such as banana oil, paint and varnish removers, and foul odors in general. These produce a loss of appetite and thus indirectly affect one's well-being.

Overcrowding in workshops, offices, and schools is a danger to health. It comes about not because there is not enough fresh air, but because persons are seated within the coughing and sneezing range of each other so that if one comes with a cold or other disease of the nose, mouth, or lungs, there is great possibility of spreading the disease. On this basis one should be seated at least 5 feet from his neighbor in all directions, or we say that he should have an area of 25 square feet to himself. The amount of cubic feet of air which he has is not of much importance, except that he should have room enough to stand up or change his position. This is because fresh air can be supplied to a small space with very little trouble, while a larger space, so far as ventilation is concerned, is often a waste of room and adds to the expense of heating. Three men customarily work in the bottom of a building caisson in less than 300 cubic feet of air, but it is, of course, always being changed. It would be much better if schoolrooms and workrooms were constructed to increase the daylight rather than to have high ceilings and small windows. It would be better both for the eyes and the skin.

Gas Poisoning.—Much more carbon monoxide poisoning occurs in the home or about automobiles than in working places. All forms of fuel-burning stoves including gas stoves should be ventilated to the outside air by means of a stovepipe. In some cases, gas heaters and other stoves may be set inside of a fireplace which has a good draft. Don't believe any "hot-air" talk which stove salesmen give you about gas stoves or salamanders which do not need flues. This applies also to gas-fired water heaters. Such water heaters should never be placed in bathrooms or kitchens unless they are adequately vented to the outside air. Even when combustion is "complete," as they call it, the end products are composed of carbon dioxide, steam, and so little oxygen as not to support life. It is exactly the same condition known as "black damp" in coal mines, or down in wells, a condition which is not tolerated by experienced workmen because it is deadly. In the case of stoves, this "black damp" also greatly favors carbon monoxide poisoning.

The symptoms of carbon monoxide poisoning, when one breathes amounts too little to produce fainting, are: tightness across forehead, headache with throbbing temples, dizziness, weak feeling, nausea and vomiting, rapid breathing and, finally, fainting. The least exercise such as getting up from a chair or

walking home from the gas-filled room makes the symptoms worse at first, because of the extra need for oxygen. Indeed fainting may occur on the least exercise. Hence we see carbon monoxide poisoning confused with a heart attack, food poisoning, candy poisoning, bad ventilation, which practically never produces such symptoms of itself in ordinary places, with overheated rooms, indigestion, insanity or "acting foolish," drunkenness, asthma, pressure on the brain, neuralgia, deafness, anemia, headache from various causes, and weakness from any run-down condition. Whether or not any of these conditions are due to carbon monoxide gas cannot be told very quickly by anyone. If getting into the fresh air revives one, especially if staying away from the house or place of work where such symptoms occur restores one, there is every reason to suspect this gas in dangerous amounts. After-effects quickly disappear when only small amounts of carbon monoxide gas are inhaled. In fact, unless one is so severely gassed as to cause unconsciousness, there are seldom any after-effects which amount to anything even where one is exposed to small amounts over a long time; one tends to become "acclimatized," that is, to get used to the gas in small amounts.

A severe exposure such as may occur in a closed garage with an auto engine running "glues one to the spot" before headache or shortness of breath is noticed, followed by swooning when one attempts to move or even to shout. Complete unconsciousness continues until death, which may take place in as short a time as 10 to 15 minutes. The method of treating one who is found unconscious from gassing is described on page 130. Even a rescue from a severe exposure is very apt to be followed by pneumonia.

The mere breathing of combustion products from any kind of open fire or gas flame in the house or workroom should never be tolerated as an hourly or daily experience. Persons so exposed tend to suffer from repeated colds, shivering spells, nervousness, headaches, and anemia, even when no evidence of carbon monoxide gas is present.

Never sleep in a room in which a fire is burning. While an open window, a foul-air vent, a fireplace, or even a stovepipe on the stove may save one's life from asphyxiation, the risk is too great for any person to take. One can never tell what may happen to a fire and its smoke and fumes while asleep. Windstorms, tornadoes, changes in the direction of the wind, a brick or loosened

mortar falling down into the chimney and blocking it up, increase in the draft or gas pressure, and many other perfectly natural things may happen.

All stovepipes and chimneys should be inspected at the beginning of winter and at least once in the middle of the winter. Remember that gas fires, gas stoves, etc., do not give smoke nor sulphur fumes as a rule; therefore they are much more dangerous than coal or wood fires because the warning smoke and odors are not present. Once, in taking down the stovepipe to the kitchen gas range in my house, I found it entirely plugged up by the remains of a dead owl which had evidently fallen down the chimney, fluttered into the stovepipe, and got down as far as the damper where it died.

Remember that at night the gas pressure usually goes up, probably twice as high as during the day, because people are not using it so much overnight. Because of this, a gas stove which is burning safely when one goes to bed may have its flame so increased in height during the night as to become a carbon monoxide generator, killing all persons in the room within an hour or so. Then when the pressure goes down in the morning, as people in the neighborhood begin to use the gas, the flame of the stove goes back to its previous height and ceases to yield this poisonous gas. For a long time, deaths of this kind were a mystery. Again, there is a possibility that the gas pressure may be shut off, causing the fire to go out. When it comes on again, carbon monoxide poisoning or an explosion, when one lights a match, may result. Another reason for never sleeping in a room in which there is a fire is that some person may come in late or get up during the night, or may be subject to sleepwalking, or may be drunk, and close the damper in the stovepipe or otherwise molest the fire.

"Carbon monoxide is now and always has been, since the first discovery of fire, the most widespread poison in connection with human life and activities."

Resuscitation, that is, reviving one from gas poisoning, drowning, electric shock, or any condition causing one to stop breathing should be carried out as follows:

1. If electric shock, immediately break the circuit from the victim by using any dry non-conductor, such as clothing, a rope, or a board. Beware of using metal or any moist object. If possible, also shut off the current at once.

2. Instantly attend to the victim's breathing. This should be done by the Shaefer method, called also the "prone-pressure method." Rapidly run your finger into his mouth and throat and remove any foreign body or material such as false teeth, tobacco, etc. Lay the victim on his belly, with arms stretched straight out in front, and with face to one side, so that his nose

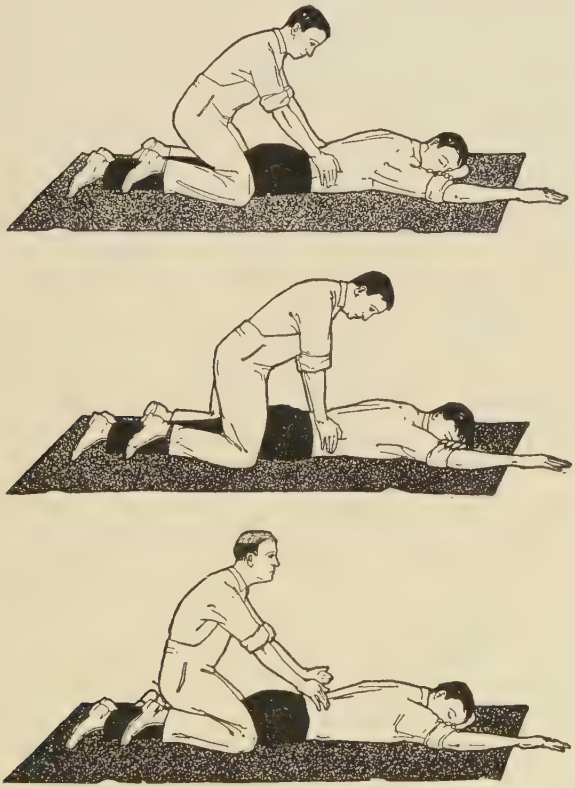


FIG. 30.—The different positions used in resuscitating a victim who has ceased to breathe, as from drowning, electric shock, or gassing. (*Dr. Cecil K. Drinker in Hygeia.*)

and mouth are free for breathing. Do not stop to loosen the victim's clothing now; every moment of delay is serious.

3. Kneel down, straddling the victim's legs and facing his head; put the palms of your hands on the sides of his back rather low down, where the floating ribs are. Spread out your fingers over the lower ribs with thumbs nearly touching over the back bone.

4. With your arms held straight, swing forward slowly so that the weight of your body is gradually, but *not violently*, brought to bear upon the subject's lower ribs. This act should take place in 2 to 3 seconds.

5. Then immediately swing backward so as to remove the pressure and return to the first position, at the same time counting 1, 2, 3, 4.

6. Repeat this process every 4 or 5 seconds, that is, 12 to 15 times a minute swinging your weight forward and back upon the victim's lower ribs. Usually you can hear the air pass in and out of his mouth. If an assistant is with you, have him see that the victim's tongue is pulled forward by grasping it with a handkerchief, but see that the handkerchief is not left in the mouth to block it up.

7. As soon as possible but without stopping the breathing movements, loosen any tight clothing about the victim's neck, chest, and waist.

8. Continue the artificial respiration, if necessary, 2 hours or longer, *without interruption*, until natural breathing is restored, or until a physician arrives. If natural breathing stops after being restored, repeat as before.

9. Do not give any liquid by mouth until the victim is fully conscious.

10. Do not use any pulmotor, lung motor, or other breathing apparatus except an oxygen tank until a physician arrives and takes charge. The oxygen-carbon dioxide apparatus (called the "H. H. Inhalator") invented by Henderson and Haggard of Yale University and approved by the U. S. Bureau of Mines should be used if at hand, and gives better results than straight oxygen alone. The prone-pressure artificial respiration is continued, as before, while the victim is breathing from this apparatus.

11. Give the victim fresh air, but also keep him warm.

Unless breathing movements take place either by the efforts of the victim himself or by someone's aiding him within a period of 5 to 10 minutes from the last breath of air exchange which he has taken, death will invariably take place. As there is no definite method of knowing the length of this critical time, efforts to revive the victim should be continued for about 2 hours. It is not considered advisable any more to use a pulmotor, lung motor, or air-breathing apparatus, all of which force air into the lungs, as this is an unnatural way of breathing, contrary to Nature's

method, in which breathing is done by suction into the lungs and not by forced pressure. Grave danger to the lungs may follow forced pressure of air into the lungs.

General Remarks.—Many persons are compelled to stay indoors and breathe foul air during the day through no fault of their own. Remember, however, that all persons can invariably get fresh air to breathe at night, especially while asleep. The cool outside air is very refreshing to the nose and throat as well as to the skin of the face and exposed parts of the body. Oftentimes a dry, sore throat, which causes a cough, can be relieved overnight by breathing fresh air.

Dr. Trudeau who founded the famous tuberculosis sanitorium at Saranac Lake, in the Adirondack Mountains, New York, is called the "father of outdoor air." Dr. Trudeau, whose life was dispaired of at 20 to 22 years of age because of consumption, managed to live out a long and useful life and to discover many things in the treatment of consumption and other diseases of the lungs. His "Autobiography" is a book well worth reading by those who suffer from chronic lung disease of any kind. It relates his outdoor life in the forests and mountains where he was compelled to live practically all the time. Many persons who are on the verge of a nervous breakdown can often wonderfully revive themselves by getting out of doors, taking two or three breaths at a time, every hour of the day, and breathing outside fresh air at night.

It used to be thought that night air was bad to breathe so that people throughout the world got into the habit of closing their windows and doors on going to bed, if not before. It is now known that this originated in Italy and other southern countries because of the prevalence of malaria. Malaria is spread by a mosquito which flies about especially after dark, so that keeping the windows closed appeared to stop the disease. All that is necessary is to screen the windows to keep insects out. It is dangerous to health to coop up the air of the day and rebreathe it during the night, because such air has no stimulating properties of coolness, changeableness, and recent contact with outdoor nature.

Much of the real health value which a person gets from a camping trip in the woods, mountains, or elsewhere comes from the cool air breathed overnight. One who breathes night air at night awakens very much refreshened for the next day's work or pleasure.

CHAPTER VIII

THE BLOOD AND CIRCULATORY SYSTEM

The term "vascular system" is used to include both the blood and the vessels in which it flows. It is composed of the heart; the arteries, which carry the blood away from the heart; the veins, which are thinner walled and carry the blood towards the heart; the capillaries, the tiny connecting vessels like those in the skin which allow the blood to pass from the arteries to the veins and, in the meantime, to the body cells to take out of it what they need for nourishment and give back to it their waste products; the blood itself and the lymph or clear fluid formed outside of the blood vessels like the water in a swamp through which streams flow.

All the blood vessels, cells, nerves, muscles, and other parts are surrounded or bathed by a fluid called lymph, which is really the fluid part of the blood which passed in and out of the smaller blood vessels while the blood corpuscles are held back by the blood vessel walls, within which they rush along at a very fast rate. The heart pumps the blood along so fast that practically all of it passes through the heart and lungs two to three times each minute, and even faster during exercise.

Bright red blood contains the most oxygen and is found in the arteries which have just received it from the heart and lungs. The pressure is so high in the arteries that they throb or show a pulse when near the surface, and also spurt blood if cut.

The veins contain a blue-colored blood with much carbon dioxide in it which has been gathered up by the capillaries as a waste product from all of the cells in the body to be returned to the heart and lungs in order to get rid of the carbon dioxide and take up a fresh supply of oxygen. The pressure in the veins is so low that no pulse can be felt in them as a rule and, when cut, the blood flows out in a steady stream of a dark-blue color.

It is usually difficult to get a flow of lymph without blood but it is lymph which fills a blister and which makes the lower layer of skin look moist when the upper layer is separated off. It is

also lymph which lubricates and moistens the covering of the intestines, liver, heart, and lungs, and the lining of all of the cavities of the body.

The purpose of the vascular system is to carry nourishment from the digestive organs, and oxygen from the lungs, to all of the cells of the body; "internal secretions" from one organ to another; protective substances against disease germs; and the waste products of cells to the various organs of elimination—the kidneys, the liver, the bowels, the lungs, and the skin.

The blood is composed of tiny cells and the fluid (serum, plasma) in which they float. The fluid part of the blood is made from the water, salts, and food which we eat, while it likewise contains the waste products from each little cell in the body. The cells which flow in the blood are called "corpuscles." The vast majority of them are red in color, due to iron which they contain. These red corpuscles carry oxygen from the lungs to the tissue cells. They are made in the red marrow of the bones. A very small per cent of corpuscles are colorless or white. These white corpuscles, or white cells, are actually alive and able to move about by themselves, provided they are kept in a slightly salty fluid like the blood. The white cells are made partly in the red bone marrow and partly in the lymph glands or "nodes" which are scattered throughout the body. The white corpuscles act as soldiers in protecting the body from germs (bacteria) and poisons. Under the microscope they can be seen to "swallow" or surround germs. They are the main constituents of "matter" or pus which one sees in a boil or sore which is infected. Pus is composed chiefly of dead white corpuscles which have died on the battlefield in the struggle against some invading bacteria or poison.

The lymph glands are specially grouped together in the vicinity of joints, in the neck, in the middle portion of the chest, and in the walls of the intestines. Slight enlargements of them, usually due to disease, or to disease which was once present but has left them enlarged, can often be found below the angles of the jaws, in the armpits, and in the groins, all of these groups being just beneath the skin.

We now know exactly how many red corpuscles and white corpuscles a person should have in a drop of blood of a certain size (1 cubic millimeter). When a lessened number of red cells is present, one has anemia. Likewise there is something wrong

when the white cells are increased or decreased in number. The proper number of both red and white cells is very much affected by different diseases, so that the physician or his laboratory assistant counts the blood cells and measures the amount of red color in the blood to help him in diagnosing many diseases; also to find out in advance whether things are getting better or worse during the course of a disease.

Man has also discovered how to aid these corpuscles in their battle with disease as well as to stimulate them when sickness is present. Vaccines and serums do this and from this has come the possibility of checking or preventing certain diseases in a way that almost resembles miracles. By this means certain diseases like diphtheria, scarlet fever, typhoid fever, lockjaw, smallpox, and mad-dog bite (rabies) are being rapidly controlled or prevented, as we see daily all around us.

In addition to the above, the blood has a principal duty to perform in regulating the temperature of the body. Each little cell in the body has chemical changes (called "metabolism") constantly taking place in it, which give off heat. This heat warms the blood which carries it to the skin and lungs where the extra heat is given off. One of our chief dangers is not to keep from being cold but to keep from being overheated by this chemical action. When one has a fever, there is an extra amount of chemical action taking place in the various body cells and also an interference with the giving off of the heat, epecially in the skin. It is for this reason that we use a thermometer to test this heat condition and to find whether fever is present or not. The correct use of a thermometer is necessary. While we usually put the thermometer in the mouth under the tongue, it can also be placed under the arm, or into the rectum, or any place where the bulb of the instrument is covered for a few moments. We usually use the mouth because it is the most convenient and is pretty well inside the body. However, one's temperature should not be taken in the mouth for at least 15 or 20 minutes after one has drunk or eaten anything cold or hot, because the thermometer is affected and does not give a true reading of the temperature present in the body.

The worker or layman has but few methods of determining anything about the health of the vascular system. Even these methods are only rough ones and do not convey very trustworthy information. On the other hand, the doctor and his laboratory

assistant can determine quite accurately whether conditions are good or bad. In a methodical way he determines the condition of the heart, the blood vessels, the blood, and the lymph. He finds out considerable by feeling the pulse, usually in the wrist, by taking the blood pressure, usually in the upper arm,[1] and by taking a drop or so of blood and examining it microscopically and chemically.

The person himself, however, has certain tests which he can make. The so-called "Russian test" is one said to have been much used in the Russian army for determining quickly the question whether a man had a "strong heart" and lungs and would make a good soldier. He was asked to hold his breath as long as he could. This is the same test as mentioned before for the health of the lungs. A grown person should be able to hold the breath for at least 40 seconds. Another test is to run upstairs and see how it affects the breath and the pulse and how quickly one can get over such effects. A similar test is done by hopping across the room and back on one foot.

In all of these tests a person should recover within 2 or 3 minutes from any shortness of breath or quickened pulse or feeling of weakness. If such simple exercises cause distress, by all means a physical examination should be made to determine what is wrong. The strength of the heart and of the blood vessels is the basic thing in determining our health and in fact how long we are likely to live, so far as the body's powers are concerned. A person with a good heart and plenty of rich red blood has a good chance of overcoming many diseases as well as accidents.

Diseases of the Heart.—About one in every five persons 10 years of age and over will die of heart disease, and a great many of them before old age is reached. Much of this early death from heart diseases can be prevented. The commoner diseases of the heart are (1) inflammations of its walls (myocarditis) and (2) of its linings and valves (endocarditis), both of which produce weakness, enlargement of the heart, and poor "pump action." The heart also suffers secondarily in all infections and poisonings of the body. We are much interested in

[1] It is a commonly accepted rule that an adult person's blood pressure should not be more then the number of years of his life plus 100, so that a person at 30 years of age has an upper health limit of 130, measured by the usual methods. As one grows older it is better to have the figure less than one's age plus 100 than to have it higher.

what causes these inflammations, since many of the causes can be prevented. As long as the heart and blood vessels are not inflamed, or the valves of the heart leaking, it is practically impossible to overstrain the heart or damage the vascular system. Also by physical exercises one can greatly increase the strength of his heart and blood vessels and thereby his "wind," or "staying powers," and his resistance to diseases. However, when any inflammation or disease is present anywhere in this entire vascular system, damage invariably results from exercising or straining oneself in any way. Even the exercise involved in overeating or in excitement may cause injury or sudden death. These diseases and inflammations which damage the heart are chiefly rheumatism, syphilis, colds, tonsillitis, bad teeth, pneumonia, and acute infectious and contagious diseases of all kinds. Hence the prevention of heart disease usually starts early in life in the prevention of these other afflictions.

Most disease of the heart starts before persons are 6 years old. Thereafter it is a matter of new infections occurring some place in the body, rather than overwork, that makes them worse. Many of these earlier cases get entirely well. Many can be cured enough for all practical purposes and need not interfere with one's after-life. During childhood every attention must be given to preventing or watching and controlling these afflictions if we expect to prevent heart disease later in life. We can prevent valvular heart disease, enlargement of the heart, weak heart, and anemia by stopping or controlling the diseases mentioned. It is impossible by an operation to get into the heart itself, and even drugs do not have as much importance in stopping disease in the heart as in stopping the diseases before they affect the heart.

To repeat, rheumatism, syphilis, pus pockets in the gums, tonsils, gall bladder, etc. damage the heart and the blood vessels very much, so that one should have these diseases stopped as soon as possible. Special attention should be given to the kind of work one is able to do while suffering from any form of heart disease. Special clinics are now being organized throughout the country for this purpose.

Many persons foolishly worry about weak hearts, valvular disease, etc., because they were once told, perhaps early in life, that they were thus afflicted, whereas oftentimes they have so far recovered that there is no basis for further worry or concern.

They should be enjoying life doing their usual work, taking regular exercise, etc. In fact, the most dangerous heart diseases are usually unknown to the victims.

In childhood and early adult life most people with heart disease are underweight, somewhat anemic, and are often thought to have tuberculosis. They are especially inclined to eating candy and sweets to excess. Common symptoms of weak heart are shortness of breath, anemia, pains about the heart, palpitation, irregular pulse, headache, attacks of indigestion, poor sleep, having to sleep with two or more pillows, and, perhaps, dropsy. Sometimes a woman will not marry or, if married, will not permit herself to become pregnant for fear of losing her life during childbirth. As a matter of fact, very few women during this period of life, even when they have heart disease, die as the result of childbirth. Sudden death from heart diseases is actually rare except in old persons, while those who have had heart attacks have good prospects of continued health when they seek competent advice and follow it.

Hardening of the arteries (**arterio-sclerosis**) occurs as a natural process of old age. Unfortunately it comes in others from high blood pressure, which occurs in many chronic diseases; also from long-continued infections like rheumatism, syphilis, and gout; and from poisons like lead, mercury, and others. It is especially associated with overweight and overeating. In the past it has been said to be due to alcoholic drinks, to excessive smoking, bad tonsils and teeth, and to eating too much meat, but recent investigations do not support these statements. Hardening of the arteries is found in diabetes and especially in connection with Bright's disease. It appears to run in certain families, and so may be hereditary at times. To the author's mind it is just as apt to be due to the "civilized man's diet," described on page 56 as anything else. Hardened arteries are usually found accompanied by high blood pressure, but not always. One of my patients was an old man whom I took care of from the time he was 90 until his death at 97 years of age; his arteries were like "pipe stems" in his arms, but his blood pressure was never over 110 (see footnote, p. 137).

To control this hardening, the apparent cause, such as an infection, poisoning, overeating or improper diet, and bad habits in general should be discovered and corrected. Much more rest of body and mind should be taken until the blood pressure is

lowered. Hardening of the arteries often results in an enlarged heart accompanied by headaches, shortness of breath, very sharp pains in the heart (angina pectoris), and much general distress. Oftentimes without warning there is a bursting of a blood vessel in the brain. This is called an "apoplectic stroke" and usually at once causes paralysis of one side of the body, if not immediate death. Oftentimes the high pressure is relieved by a nosebleed, or a hemorrhage may occur elsewhere.

Constipation should be carefully avoided, and excitement and the physical and mental strains of modern life. It is remarkable how persons may go along with hardening of the arteries, sometimes not even feeling very much different from normal and not seeking medical aid until a stroke or something equally bad occurs. Syphilis and lead poisoning bring about this condition much earlier in life than other causes, but after 40 years of age most persons have a tendency toward hardening of the arteries from causes not well understood, so that physical examinations and medical advice at intervals are very necessary. When high blood pressure is found, simply take life easier, don't worry about the condition, obey the general rules above stated, and the prospects are very good.

Varicose Veins.—Another common disease of the blood vessels, particularly of the lower limbs, is varicose veins, or knotted and oftentimes bluish, snake-like veins under the skin. These result from typhoid fever, from childbearing, and especially from getting up on the feet and returning to work after a spell of sickness before one's strength has returned; also from prolonged standing, wearing of tight garters, forceful use of the legs as in shoveling or bicycling, from sitting too much, and from old age. The legs often feel tired, heavy, and painful. Some swelling of the ankles often occurs, the skin turns dark, eczema and ulcers come on slowly, while sometimes a vein bursts, causing a bad hemorrhage. Most cases of varicose veins could have been prevented. When once present, much can be done for them by removing garters, changing occupations, wearing elastic stockings and especially by surgical operations, which often cure them entirely.

Anemia is a very common condition among workers. The term means lack of enough blood and especially of the red coloring matter in the blood, so that the person is pale looking. The lips and inside of the eyelids show the paleness plainly. The victim is short of breath on a little exertion and easily tires out.

Anemia is not a disease but a symptom and should be treated in relation to its cause, which may be due to many things. There are to be considered, first, lack of good food, and chronic diseases like tuberculosis, heart disease, Bright's disease, liver disease, and cancer. In mothers, it may be due to nursing and constant worry about the children. A common anemic condition formerly present among young women, especially blonde girls between 14 and 20 years, was chlorosis. This seemed to occur from ill feeding, overwork, inside work, lifting, stair climbing, wearing of tight corsets, love affairs, dyspepsia, constipation, and menstrual disturbances. Since fashion has tabooed the tight corset and tight lacing, this affliction, called also "green sickness" from the pale greenish color of the skin, has practically disappeared! Fatigue may cause anemia. It may be due to infections like hookworm disease, tapeworm, malaria, acute heart infection, blood poisoning, typhoid fever, rheumatism, or syphilis. Occasionally anemia is due to ulcers of the stomach; to blood vessel disease like aneurism, bleeding piles; and to "bleeder's disease" (which is hereditary and occurs in males only). Most poisons produce anemia, particularly exposure to arsenic, carbon bisulphide, hydrogen sulphide, phosphoreted hydrogen, hydrocyanic acid, mercury, lead, antimony, TNT, and, in some persons, perhaps the constant breathing of carbon monoxide; also benzol, benzine, gasoline, nitrobenzol, nitrous gases, and anilin, as well as certain anilin dyes. Sometimes drug poisons produce anemia from overuse, such as acetanilid and phenacetin so commonly used for headaches, and potassium chlorate used for sore throat. Foul air combined with lack of sunshine may cause anemia, as seen in miners, shop girls, sewing women, hotel workers, etc. Night work may, also. Heat is a cause, as is seen in bakers, foundrymen, and smiths. Certain dusts produce anemia, as seen in workers in marble quarries, grinders, polishers, and those exposed to silica dust in general; also jute, cotton, fur and felt dusts. One form of anemia known as "pernicious anemia" has unknown causes, although it may be associated with pus pockets in the teeth or tonsils. It occurs mostly in men over 35 years of age.

The sensible treatment for anemia is to find the cause and remove it. Fresh calves livers make the best tonic for anemia. A teaspoonful of tincture of cardamon compound in a little water before meals will stimulate the appetite. Iron, arsenic, quinine, strychnine, etc. will be prescribed by the physician. In fact, the

modern physician with his laboratory is highly successful in running down the cause of anemia and also the cause of internal bleeding which shows so quickly as anemia.

Diseases of Lymph Glands.—The lymph glands and their connecting ducts suffer in three very common and dangerous diseases: syphilis, tuberculosis, and cancer. There is practically always swelling or lumps under the skin in the vicinity of the joints when these diseases are present, and a person should seek medical aid quickly. In addition to these, germs often cause blood poisoning by spreading through the lymph channels, as up the arm or leg following a cut or sliver or infected wound. A red streak usually shows this extension. Again prompt aid should

FIG. 31.—Roof-garden gymnastics for girls who are sufferers from heart disease. (*Sophia Boucher in Hygeia.*)

be secured. The enlarged glands in the neck have been described in connection with the tonsils and teeth.

In closing this chapter, a word of encouragement should be given to those who suffer from any disease of the heart, blood vessels, or lymph glands. Persons with diseased or weak hearts may be able to live out a complete lifetime by carefully following the advice of physicians and heart specialists. They are often able at the same time to make a living. This is because this organ has wonderful adaptability and powers of meeting the damages which occur to it. The same may be said of hardened arteries, high blood pressure, and the diseases causing swollen lymph glands. Even persons who have developed dropsy, great shortness of breath, and a feeling of impending death may recover and live for years, with proper care.

CHAPTER IX

THE KIDNEYS, BLADDER, AND SEXUAL ORGANS

The kidneys are located, one on each side of the body, rather high up in the small of the back, much higher than most persons think, so that much of the pain in the back, which is attributed to "kidney trouble," has nothing whatever to do with the kidneys. In fact, most such pain is in the muscles, ligaments, and joints of the back and not in the kidneys or vital organs within the body cavity. It is rare for kidney disease itself to show any pain in the back. Headache is a very much more common sign of kidney disease than ache or pain in the back.

The kidneys are filtering organs to which all of the blood of the body flows two or three times a minute in order to have certain kinds of waste products removed or filtered out. As we know, much if not most of the water which we drink or which is in our food is passed out through the kidneys. Along with this water go many salts, urea, uric acid, ammonia, and other waste products brought by the blood from each little cell in the body.

It is said that the kidneys are so remarkably constructed with superior powers for work that as much as twenty-three twenty-fourths of the substance can be destroyed by slow injury or disease before death occurs; in other words, the kidneys can perform the average day's work on approximately one twenty-fourth of their capacity. They are, in this respect, the same as the lungs, heart, liver, and other vital organs, very superiorly equipped for their average duties. Hence, before a person dies of kidney disease, his kidneys have been either overwhelmed with poisons or toxins, or largely destroyed, bit by bit, by disease lasting usually over a long period of time.

The kidneys are so closely associated with disease of the blood vessels, blood, and heart that any damage to the kidneys soon results in symptoms if not damage to these other structures. The opposite is true also, so that physicians always look for disease in all three or four structures at the same time.

Signs of Kidney Disease.—There are certain signs which indicate that Bright's disease or kidney disease is present. These are headaches, tired feeling, necessity of arising at night to urinate, poor sleep, anemia, shortness of breath, coughing and asthma, attacks of nausea, dizziness, vomiting, and perhaps diarrhea alternating with dyspepsia and constipation. Dropsy usually begins sooner or later, with puffiness of the face and eyelids, followed by swelling of the feet and ankles. An itching over the body is common. Sometime the person is delirious and even mania occurs. Paralytic strokes may take place because Bright's disease raises the blood pressure, usually very quickly, and this probably accounts for the severe headache which takes place.

The physician and his laboratory assistant have means of accurately learning the condition of the kidneys by examining the urine and the blood, sometimes using the X-ray, etc. He can also tell which kidney is damaged and what the capacity of each kidney is, that is, how badly it is damaged. All of this can be done without an operation or much inconvenience to the sufferer.

The Causes of Kidney Disease.—Kidney diseases are due to practically the same things that cause heart disease and blood-vessel diseases, as described in the previous chapter. They are also very apt to follow disease of the bladder, so that venereal diseases and other inflammations of the urinary tract should be stopped as promptly as possible to prevent the germs from going up from the bladder to the kidneys. I mention this particularly because many of these infections of the bladder and genital organs are not particularly painful and for other reasons such as the desire to hide one's immoral actions are not confided to the physician in sufficient time to prevent Bright's disease.

Acute inflammation of the kidneys may follow the inhaling of turpentine vapors, or exposure to arsenic or carbolic acid. Chronic inflammation is often produced by lead, mercury, and other heavy metals; also by benzine, benzol, and other petroleum and coal-tar products.

Scarlet fever in particular is apt to injure the kidneys severely, causing dropsy within a few weeks after one has apparently recovered from scarlet fever. Death sometimes results from this dropsy, but more often it subsides, and a chronic, slow-going Bright's disease follows which may not show bad signs for many years afterward. Yet it may be completely recovered from.

The author himself had an experience of this kind when about 11 years of age when he had what was probably a mild case of scarlet fever lasting for a couple of days. No physician was called and no particular rash was noticed. A few weeks later I began to feel poorly, and dropsy appeared. This became so extreme in the course of a week or 10 days that my legs and body up to the chest were swollen almost twice their size. I did not suffer much, but naturally my parents were greatly alarmed. I recall that the old German doctor who treated me gave me much physic and had my mother place me in a washtub of water as hot as I could stand, twice each day. I was also given some medicine, kept in bed, and carefully fed. In the course of several weeks I recovered entirely, in fact so completely that careful examinations made many times since have failed to show any evidence of resulting damage. Perhaps, however, half of the kidney substance was destroyed; yet inasmuch as I have never taxed these organs with alcoholic drinks and have been reasonably cautious about my health, I have been able to survive easily on the rest of the kidney substance left. Also, I have never noticed any inferior capacity for hard work, mental or physical, including factory work, gardening, mountain climbing (to the top of Pike's Peak) and for long hours of brain work. From this you can see there is much hope for one who has suffered even severely from kidney trouble.

The commoner diseases of the kidneys are called "nephritis" or "Bright's disease," and result from inflammation. This is invariably due to some infection such as scarlet fever, diphtheria, pneumonia, the germs from bad teeth and tonsils, tuberculosis, and others. Poisons taken into the system, such as alcohol, especially in stronger drinks, the breathing or absorbing of turpentine, mercury, lead, and many industrial poisons damage the kidneys. When one is constipated, the kidneys have much more work to perform. "Autointoxication" may damage the kidneys. Incorrect diets, especially those which are too concentrated or produce too much acid in the body are said to damage the kidneys. Kidney stone is usually the result of an infection of some kind or the attempt on the part of the kidneys to handle poisonous waste products. Occasionally cancer develops in the kidneys. Rather commonly an abscess may form around the kidney, usually of unknown cause except that the germs have gotten there from places of infection, such as bad teeth and

tonsils. Floating kidney and loose or movable kidney is a rather common affliction. It is due to weakness in the ligaments which hold the kidney in place, and probably results from getting up too soon and going back to work after a long or severe spell of sickness. Other heavy organs may also stretch their ligaments and slide down out of place at the same time. It occurs more often in women who have borne children. While it causes "kidney colic," a very severe, painful condition, it is usually not fatal and the kidney can usually be kept back in place, sometimes by a supporter but at least by a surgical operation.

Uremia is a poisoning of the blood, the brain, and nervous system by the accumulation of waste matters which should have been passed out by the kidneys. Therefore it is apt to occur in almost any kidney disease. Sometimes the watery part of the urine seems to pass through all right, even in excess of what should be the case, while at other times it may be greatly lessened in amount, darker colored, even reddish, and passed with pain. Uremia usually begins with indigestion, vomiting, and sometimes diarrhea. The person soon becomes anemic and pale. Headache, dizziness, and "seeing black" are common. The headache is often very severe and in the front of the head. It is probably due to high blood pressure. The breath is short, and breathing may be irregular and gasping. One commonly becomes drowsy and often has twitching of his face or eyelid, hand or arm. A violent convulsion may take place. Sometimes asthma occurs in place of convulsions, but both may be present. In other cases there is a terrible restlessness. The patient is half unconscious, will take nothing, does not sleep, and is in a state of great distress, continually tossing, turning, pulling the bed clothes up, throwing them off, and trying to get out of bed. Sometimes a paralytic stroke occurs. Uremia is dangerous and calls for immediate medical assistance; yet it has been my experience that many people will let such symptoms occur and not seek treatment until a convulsion or paralysis has resulted. A careful examination of the urine, the blood, and the blood pressure is necessary to tell this disease. Remember that uremia may occur in young persons as well as in older persons; also that spells of restlessness, difficult breathing, headache, and nervousness should always call for a trip to the doctor's office promptly. Uremia is one of the most common afflictions with which busy people suffer

and is apt to be fatal unless promptly treated. The treatment is usually quite successful if started before the kidneys have been badly damaged.

The bladder is subject to several diseases although, fortunately, none are common. These are stone in the bladder, infection of the bladder, tuberculosis, and tumors. The underlying causes of stone in the bladder are infections in its walls, stone or "gravel" coming down from the kidneys, and obstruction to the outflow of urine caused by a stricture or by an enlargement of the prostate gland (located at the neck of the bladder) which results in a holding back and stagnation of the urine, and infection. Workers with anilin oil, as in dye works, have been known to develop tumors of the bladder. However, the commonest tumor is an enlarged prostate gland (see below). Diseases of the nervous system and paralysis predispose to bladder infections as do also certain general diseases producing an excess of certain waste matters and salts in the urine. Such infections, if not stopped, cause stones to form. Strictures occur chiefly in young men and are usually due to clap, that is, gonorrheal infection. They always require treatment by a good doctor. Enlarged prostate gland may be due to gonorrheal infection in younger men or simply to old age alone. Both stone in the bladder and an enlarged prostate gland show signs such as the sudden stopping of the flow while urinating and sometimes the passing of gravel, both of which occur with great pain. It is fairly easy now to examine the inside of the bladder with a small electric light, and to deal successfully with stones, gravel, and tumors of various kinds.

Inflammation of the bladder may be due to injury, sometimes to pregnancy, and to the presence of a stone, a tumor, or anything causing a blocking of the flow of urine, and especially to the spreading inward of an infection from the outside parts, or germs coming down from the kidneys. The infection from outside parts is usually gonorrhea. Inflammation of the bladder is shown by pain on passing urine, desire to urinate often, sometimes thick, white, or reddish urine, and oftentimes eczema of the skin about the private parts. The bladder is quite resistant to infection, so that if the underlying causes such as gonorrhea, stone or gravel, tuberculosis, tumors, or constitutional disease are removed or controlled, the bladder promptly tends to get well.

The hygiene of the sexual organs is of great importance and yet Nature has usually provided for their health and well-being without interference further than what common sense would dictate. Their ill health is a matter of commission rather than omission. These organs are subject to three unusual diseases, called "venereal diseases" and known as gonorrhea, syphilis, and soft chancre. Gonorrhea and syphilis are the most common and the most dangerous. These are unusual in that they do not occur in lower animals, nor do they usually occur in man except through immoral relations. It would seem as though they had been laid upon the sinful as a foreordained punishment for immorality. Warning in advance, and not afterwards, is what is needed to combat these scourges.

The importance of these diseases is readily seen, for example, in the Dispensaries of Ohio State University where more visits are recorded for sufferers from venereal diseases than all other diseases and surgical afflictions combined. The same is true, more or less, in most large general dispensaries. The persons so afflicted are mostly youths and adults in the active years of working life. The loss of time, the suffering, and the shortening of life from the complications which follow venereal diseases are incalculable.

Kenelm Winslow[1] states that health authorities in some places estimate that eight out of ten men acquire gonorrhea and that as high as three out of every five married women become infected with the disease in consequence. Gonorrhea is by far the commonest cause for operations on the sexual organs of women, and oftentimes of men. A large part of sterility (childlessness) is also caused by it. "Ten per cent of all blindness, and 70 to 80 per cent of blindness in the newborn, is attributable to gonorrhea."

This disease is vulgarly called "clap" and, when long standing, is called "gleet." The germ is well known and easily found under the microscope; also it is very easily spread by direct contact between persons. It does its damage as a local rather than a constitutional disease or a blood poisoning. Its complications are very frequent and severe, and include stricture, inflammation of the prostate gland and of the bladder, nephritis, peritonitis (especially in the female), a severe form of rheumatism of the joints with the accumulation of pus in them (especially in the

[1] "Prevention of Disease in the Individual," W. B. Saunders Company, 2d ed., 1924.

male), inflammation of the iris (edge of the pupil of the eye), and sometimes valvular disease of the heart. Most unfortunately the diseased male or female spreads it to the opposite sex, the victim, often a wife, being entirely innocent. From an infected mother during childbearing the germs of gonorrhea may get into the eyes of the baby at birth causing a rapid and severe inflammation and blindness, the prevention of which is discussed on page 215. (The various complications of gonorrhea are

FIG. 32.—These bones of Moundbuilders, which now repose in the Ohio Archeological and Historical Museum at Columbus, show syphilis in different stages. This disease is said to have been spread to Europe by Columbus' sailors in 1493. (*Dr. Hugh J. Means in Jour. of Roent. and Radium Therapy, April,* 1925.)

further discussed in many places in this book, for which the index should be consulted.)

On the other hand, syphilis begins as a local disease (called hard chancre, which is the first stage), but without much local trouble. In 2 or 3 weeks' time it becomes a constitutional disease. It next usually shows as an eruption or breaking out on the face and body, called "pox," accompanied with a slight sore throat and sore mouth (second stage). It is very infectious by direct contact during the first two stages, and treatment should be started at once to prevent its spread both in the individual and to others. As time goes on, it penetrates the deeper organs (third stage)

including the brain and nervous system, leading to many severe and oftentimes fatal complications, as explained elsewhere (see index).

Syphilis is due to a vegetable parasite or germ which may be likened to the growth of a mold in the body tissues. It is the chief blight of the human race today, as leprosy appears to have been in ancient times.

Concerning syphilis, the American Social Hygiene Association considers it one of the most killing diseases known, especially

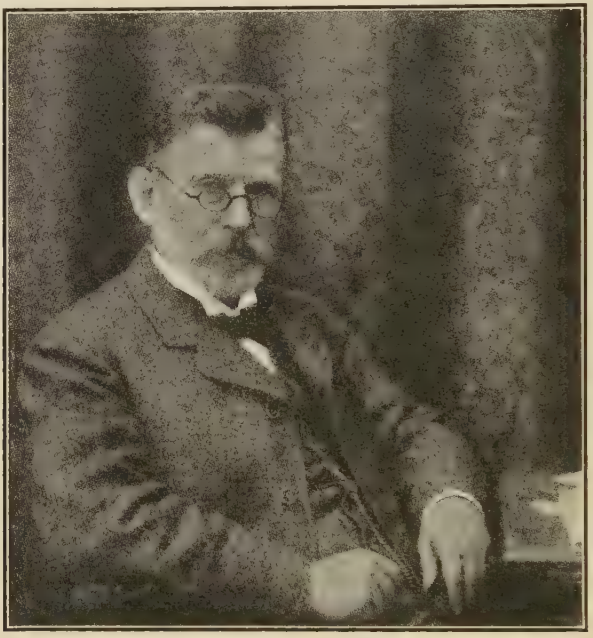


Fig. 33.—Paul Ehrlich, discoverer of the cure for syphilis.

when its complications of later life are looked into. It causes 100 per cent of locomotor ataxia, of insanity accompanied by paralysis (paresis), and certain hereditary or congenital diseases; 50 per cent of organic heart disease and of angina pectoris; 40 per cent of diseases of the arteries, of apoplectic strokes (and most of those which occur in persons under 40 years of age), and of softening of the brain; 30 per cent of Bright's disease; and 10 per cent of epilepsy, brain inflammation, and meningitis.

Yet this disease is much more easily cured than gonorrhea, and can almost without exception be entirely controlled by

modern methods of treatment *if treatments are taken early and are persisted in.* The sooner treatments are started the more likelihood of a complete cure. A special blood test will show whether one has syphilis or not, and also when he has been freed of it by treatment. This simple test is now made in all first-class physical examinations (unless knowledge is at hand from other sources), and is required in all patients in some hospitals, and for certain insurance examinations, etc. This is because many persons have syphilis who honestly do not know it, as they do not feel sick.

Occasionally one of these venereal diseases is acquired from kissing, or from using soiled towels, washrags, etc., but on the whole this is rare in adult persons; children are more susceptible. The excuse of having got a venereal disease from the use of a public toilet or from a fellow worker of the same sex is usually a poor one. The doctor will rarely ask about the exact source of a venereal disease, but he should be told voluntarily. This is advisable so as to get his aid in curing or protecting someone else, or the public.

A person should know that he is possibly ruining his future by acquiring a sexual disease, as well, perhaps, as the future of his possible children. Therefore, one should have a life ambition to keep in front of him the necessity of maintaining his health and good habits in order to accomplish his ambition.

Before marriage both parties would do well to see a physician for a health examination, on general principles, and for advice, at which times these matters may all be confidentially discussed. Some states now require a physician's certificate of health before issuing a marriage license.

Practically all women in houses of ill fame, all prostitutes, and "street walkers" are infected with one or all of the venereal diseases. Oftentimes two and sometimes all three of these diseases may be caught at the same time.

The very best advice for one who fears or knows he (or she) has a venereal disease is to confide at once in the family physician. It is always poor policy to confide in a friend or to seek some strange physician, or the drug store, for one usually falls into the hands of an ignoramus or a "quack." It is also very unwise to try to treat yourself or to follow the instructions given in books, pamphlets, or reading matter which sound so plausible, but practically never fit the case at hand and often, if followed,

cause severe injury and also dangerous delay. The physician whom you have known or who has a general family practice is the best man for advice, if not for treatment. He is also always careful to keep such matters strictly private even from your family and will be the last one to chide or upbraid you, since he can grasp, in a second, what the whole situation means to you, your family, and the future. His business is to be a rescuer and say nothing. He is your friend both as a doctor and as an advisor.

Prevention of venereal diseases is therefore largely a matter of proper training and education during school life, and of right

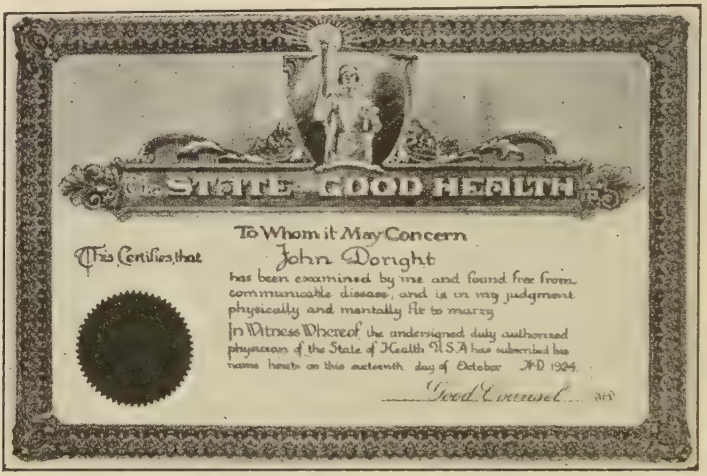

STATE GOOD HEALTH
To Whom it May Concern
This Certifies that
John Doright
has been examined by me and found free from communicable disease, and is in my judgment physically and mentally fit to marry
In Witness Whereof the undersigned duly authorized physician of the State of Health U.S.A has subscribed his name hereto on this sixteenth day of October A.D. 1924.
Good Counsel M.D.

FIG. 34.—Facsimile of a health certificate for marriage. (*Permission granted by Herman M. Bundesen, M.D., Chicago Commissioner of Health.*)

living and clean thinking. Will power and self-control are the basic things (see page 210 for general rules to develop self-control). Sunday schools, boy scout clubs, the Y. M. C. A., men's church clubs (with similar organizations for girls and women), and membership in a church for the individual person, these things, even more than knowledge or fear, are bulwarks for combating immorality and its sequence of direful punishments.

The reader is referred to certain pamphlets put out by the U. S. Public Health Service, Washington, D. C., for further information on the whole subject of the sex organs. Literature may also be secured from your state or city health officials and from your local doctor. Such is free of charge. The Ohio State Depart-

ment of Health has sent out over a million pamphlets on this subject every year for the past 4 or 5 years.

Should the Married Woman Work?—The social viewpoint appears to insist that it is unfortunate for married women to work, as in factories, etc., and especially during childbearing years; yet from the strictly medical viewpoint the employment of women factory hands after marriage and even during childbearing is recognized as beneficial and not harmful to health. Such women should be under strict medical supervision. Lighter work should be arranged, work which permits the use of a seat; also shorter hours and work on a time basis rather than piecework. For a period of 2 weeks before the time of delivery and for 4 weeks afterwards all regular work should be prohibited. The reader is referred to special books on the hygiene of marriage.[1]

Working mothers should have the benefit of nurseries in the plant or nearby, permitting them to take their infants to work, with time allowed at proper intervals to feed them and for the very beneficial mental effects upon the mothers themselves. During this time light work only should be undertaken by nursing mothers. By such arrangements a mother's earnings often enable her to live more comfortably and healthfully than she could otherwise; but each case must be considered on its merits.

Historians tell us that woman was the first to learn to work, because her plain domestic duties demanded it, this at a time when man was occupied chiefly in hunting and protecting his family; but, as these latter necessities eased up and woman eventually showed man how to work, there has been a tendency to forget her own historical part as a worker.

Special Health Risks of Women and Girls Who Work.—Dr. W. Gilman Thompson[2] points out that girls and women are much more susceptible than men to certain poisons which are apt to be found in some industries: lead, phosphorus, mercury, arsenic, and other chemical substances. Some of these, like lead poisoning, may affect the offspring whether it is the father or mother who is poisoned. Benzol may be a risk to milliners, shopworkers,

[1] Consult "Prevention of Disease in the Individual," referred to above, or the small book, "Hygiene of Marriage," by Dr. Isabel E. Hutton, William Heinemann Company, Ltd., 1923.

[2] "The Occupational Diseases," D. Appleton & Company, p. 60, New York, 1914.

and others using paints, stains, rubber cements, and spray guns, and even those in canning processes where rubber rings which smell of benzol are used to close the cans. Women are more affected, it is thought, by foul or toxic atmospheres, from which they are more apt to develop anemia, digestive disorders, constipation, headache, neuralgia, and neuritis.

Collis and Greenwood[1] point out that throughout the centuries woman has been accustomed to physical labor and while she is limited by her strength, size, and athletic capacity for a life of physical activity and bursts of energy, and is more affected by varicose veins, anemia, and nervous temperament, in addition to domestic interruptions, she represents the more stable portion of the race, is less liable to hernia, and possesses characteristics of great value to modern industry with its tendency to specialization and repetitive work. Professor F. S. Lee considers that the possibilities of women's work have not hitherto been clearly realized. Avoidance of night work, long hours, heavy work, constant standing, and of additional domestic duties while working are the chief points in a working girl's or woman's life.

[1] "Health of the Industrial Worker," P. Blakiston's Son and Company, Philadelphia, 1921.

CHAPTER X

THE MUSCLES, BONES, AND JOINTS

The framework and movement apparatus of the body consist of the bones, with their joints, capsules, and ligaments; the cartilages found at the ends of bones, which are most prominent in younger persons; the muscles with their tendons or attachments to bones, etc.; the connective tissue and fat; and much lymph tissue with its channels and "glands" or "nodes" and its constantly oozing lymph. It is impossible also for us to think of this whole system and overlook its rich supply of blood and blood vessels to every cell and muscle fiber, so important that if any blocking or cutting off of this supply takes place, the condition called "gangrene" soon sets in. Finally, every muscle fiber and every cell is connected by a little nerve to the nervous system so that all may be caused to work in harmony with each other. So important are these nervous connections that, if any of them are cut or interfered with and not restored, a shriveling up or "atrophy" and, finally, death of the part takes place, not necessarily resulting in death to the body as when gangrene takes place, but resulting in entire loss of use of the severed part and its change into scar tissue, usually without power for movement or sensation.

Our Powers over This System.—As we well know, the great mass of muscles move according to our own will and are therefore called "voluntary" muscles. There are many muscles, however, like those of the stomach and bowels, of the walls of the blood vessels, the walls of the air ducts in the lungs, the walls of the bladder, and womb, and even of the roots of the hair which move of themselves practically without relation to will power. These are called "involuntary" muscles. Both sets of muscles are richly supplied by blood vessels and nerves and are made to move by nerve impulses called "stimuli" which come from the brain or spinal cord or from masses of nerve cells called "ganglia."

In the chapter on the Nervous System it will be shown that the brain, spinal cord, and these "ganglia" receive their impressions or commands to send out these "motor" nerve impulses to

the muscles from impressions or stimuli from the outside world which come in over other nerve fibers called "sensory" nerves.

About one-half of the weight of the body is composed of muscles alone and nearly one-fourth, of bones. Some persons will also have a considerable part due to fat. The development and growth of all of the moving parts, such as the muscles, tendons, and even bones and joints, depend very much upon our voluntary use of them. The more used, the bigger and stronger and also more skilled they become.

The purposes of this muscle-bone system are more numerous than ordinarily considered. They include all the movements which we make, whether voluntary, "reflex" (that is, without thinking), or involuntary (that is, automatic, such as are carried on in the vital organs). These parts support the body and all its organs, give poise or balance, determine proper or improper attitudes, and therefore shapely bodies or deformities. They also support any weight which is carried.

The muscles are enabled to work by the using up of food brought to them in the blood along with oxygen, which food is said to be burned up exactly as fuel is in a furnace. The remarkable thing is that this burning-up process is done by Nature at such a low temperature as 98.5°F., and is done so thoroughly that from 25 to 45 per cent of all of the possible energy or heat units is recovered from the food which we eat, compared to 10 to 25 per cent of energy or heat units recovered for use in the best engines or power motors which have yet been invented.

In addition, the muscles are storehouses for food which is stored there while they are at rest and while we are asleep. Likewise our fatty tissues are further storehouses acting as more permanent supplies of food which is harder to use up; in fact, there is a greater tendency for most people to store up fuel and become fat than to use it up, especially after middle life and when sufficient exercise is not taken.

The muscles assist the heart and the circulation of the blood each time they contract by sucking the blood into themselves and then squeezing it out upon contraction. Thus we see that any movement causes an increased supply of blood to that part of the body, which means more work for the heart and an increase in the blood pressure, but the muscles "pay back" by helping to keep the blood flowing. This extra flow of blood also takes away waste products. Hence we have a direct explanation why exer-

cise helps the general health; it increases the nourishment and waste removal in all organs and parts. I have previously warned that this may be a damaging effect if there are certain diseases or inflammation present, at which time rest is wanted instead of movement.

The muscles also produce practically all of the heat in the body. This is the result of the oxidation of the food which is brought to them. This obeys the usual laws of chemistry and physics, that is, that oxidation produces heat. When we are apparently at rest, the movements of the involuntary muscles produce much of the

FIG. 35.—"Big muscle boy." This sort of development is no guarantee of health or long life.

heat we need. Cell life itself produces the rest. If it is cold about us and we do not move and rub ourselves, Nature sets our voluntary muscles to going by causing us to shiver. This produces very quickly an extra amount of heat, but it should be taken as a warning sign that we are being chilled and that a "cold" and possibly an infection such as pneumonia will follow if we don't "shake" ourselves and start moving about or getting warm otherwise.

The muscles, bones, and fat protect other parts of the body from injury and from cold and other hazards. They are them-

selves protected by the skin. Likewise the bones give shape to the skeleton and are different in the two sexes, especially the bones of the pelvis, hips, and limbs. Furthermore the fatty layer underneath the skin is heavier and more evenly distributed in the female so that a more rounded form or symmetry results.

HEIGHT AND WEIGHT TABLES

The following discussion and accompanying tables are taken from the *Manual* for periodic health examinations prepared by the Bureau of Health and Public Instruction, American Medical Association, John M. Dodson, Executive Secretary.

Height.—To be taken barefoot or in stocking feet.

Weight.—With usual indoor clothing. By the usual weight is meant the weight during apparent health during the past year and after attaining maturity. The height and weight chart for adults (Tables 4 and 5) is a standard height and weight chart for women and men (from 15 to 55 years) wearing ordinary indoor clothing. It was prepared by the Medico-Actuarial Investigation of life insurance companies of the United States and Canada in 1912, and is widely used.[1]

Ideally, persons examined should be stripped; but this is not always convenient. Shoes and outdoor clothing, however, can always be removed. Having recorded present weight and usual weight, in order to find out if the health client is gaining or losing, the next step is to determine if he is underweight or overweight.

This determination is usually based on averages. That is, a man is regarded as overweight if he weighs 15 pounds or more above the average man of his height and age. Recently a life insurance company devised a table which grades the various weights for age on the basis of mortality ratios, as shown by the statistics for many hundreds of thousands of persons. The study on which this table is based shows that underweights below the age of 30

[1] Tables 4 and 5 represent the average weight of only the people of a given age and height who, after a medical examination, were found apparently in sound health and accepted for life insurance. The mortality experience of persons approaching these weights has in general been found to be the most favorable except that among younger people, under 35 years of age, those slightly exceeding the average weights have a lower mortality and, on the contrary, those slightly underweight after that age have a more favorable mortality than those approximating or exceeding the standard weight. These tables are based on records of 136,504 women and 221,819 men accepted by American and Canadian life insurance companies.

have a higher mortality ratio than those above 30, while overweight below 30 seems actually to be a definite asset. On the other hand, overweight beyond certain limit in persons over 30 is a sufficient menace to cause refusal of life insurance on this ground alone.

Again, the distribution of the fat makes a difference in the risk to life. Every inch by which the abdominal girth exceeds the chest expansion increases the mortality risk to the individual about 5 per cent.

For example, a man, aged 40, weighed 189 pounds. His height was 68 inches. The average man of 40 at this height weighs 158 pounds. From the chart of the "Limits of Overweight," it was found that the lowest weight within the best mortality ratio for this man is 170 pounds, and that a weight of 189 pounds increases his mortality ratio to 20 per cent. Therefore, he should be guided in reducing his weight.

A second man, aged 38 and 67 inches tall, weighed 128 pounds. The average for this height and age is 147 pounds; 127 pounds is the lowest weight that he can have without increasing his mortality rating. This second man is within the limits found best in regard to mortality for his height and age, so that he does not need to attempt to gain weight unless he is in some way inconvenienced by his underweight.

Underweight and overweight are usually serious conditions. Younger persons and those up to 30 who are much underweight are often suffering from tuberculosis, heart disease, diabetes, or nervous afflictions. They need careful physical examinations and medical advice. It is true that with some persons it is hereditary. However, they should take twice as long to eat, should drink milk—warm, in sips, never cold—should lie down 10 to 15 minutes after meals, and breathe deeply (exercise the vital organs). They should eat more butter, oils, fruits, nuts, vegetables, and starches. It is better to be overweight while under 30 years of age. Overweight often points to chronic disease of the heart, kidneys, liver, and tonsils, and to rheumatism; also, overeating with too little exercise and eating too much in the way of sweets, starches, cereals, fats, desserts, wine, and alcoholic drinks. Such persons should drink less at meals and perhaps do most of the drinking at one time in the day. I have a friend who decreased his weight from 340 to 220 pounds in one year's time by giving strict attention to these details, while

TABLE 4.—STANDARD WEIGHT FOR MEN

Age	5 ft.	5 ft. 1 in.	5 ft. 2 in.	5 ft. 3 in.	5 ft. 4 in.	5 ft. 5 in.	5 ft. 6 in.	5 ft. 7 in.	5 ft. 8 in.	5 ft. 9 in.	5 ft. 10 in.	5 ft. 11 in.	6 ft.	6 ft. 1 in.	6 ft. 2 in.	6 ft. 3 in.	6 ft. 4 in.	6 ft. 5 in.
16	109	111	114	117	120	124	128	132	136	140	144	149	154	159	164	169	174	179
17	111	113	116	119	122	126	130	134	138	142	146	151	156	161	166	171	176	181
18	113	115	118	121	124	128	132	136	140	144	148	153	158	163	168	173	178	183
19	115	117	120	123	126	130	134	138	142	146	150	155	160	165	170	175	180	185
20	117	119	122	125	128	132	136	140	144	148	152	156	161	166	171	176	181	186
21	118	120	123	126	130	134	138	141	145	149	153	157	162	167	172	177	182	187
22	119	121	124	127	131	135	139	142	146	150	154	158	163	168	173	178	183	188
23	120	122	125	128	132	136	140	143	147	151	155	159	164	169	175	180	185	190
24	121	123	126	129	133	137	141	144	148	152	156	160	165	171	177	182	187	192
25	122	124	126	129	133	137	141	145	149	153	157	162	167	173	179	184	189	194
26	123	125	127	130	134	138	142	146	150	154	158	163	168	174	180	186	191	196
27	124	126	128	131	134	138	142	146	150	154	158	163	169	175	181	187	192	197
28	125	127	129	132	135	139	143	147	151	155	159	164	170	176	182	188	193	198
29	126	128	130	133	136	140	144	148	152	156	160	165	171	177	183	189	194	199
30	126	128	130	133	136	140	144	148	152	156	161	166	172	178	184	190	196	201
31	127	129	131	134	137	141	145	149	153	157	162	167	173	179	185	191	197	202
32	127	129	131	134	137	141	145	149	154	158	163	168	174	180	186	192	198	203
33	127	129	131	134	137	141	145	149	154	159	164	169	175	181	187	193	199	204
34	128	130	132	135	138	142	146	150	155	160	165	170	176	182	188	194	200	206
35	128	130	132	135	138	142	146	150	155	160	165	170	176	182	189	195	201	207
36	129	131	133	136	139	143	147	151	156	161	166	171	177	183	190	196	202	208
37	129	131	133	136	140	144	148	152	157	162	167	172	178	184	191	197	203	209
38	130	132	134	137	140	144	148	152	157	162	167	173	179	185	192	198	204	210
39	130	132	134	137	140	144	148	152	157	162	167	173	179	185	192	199	205	211
40	131	133	135	138	141	145	149	153	158	163	168	174	180	186	193	200	206	212
41	131	133	135	138	141	145	149	153	158	163	168	174	180	186	193	200	207	213
42	132	134	136	139	142	146	150	154	159	164	169	175	181	187	194	201	208	214
43	132	134	136	139	142	146	150	154	159	164	169	175	181	187	194	201	208	214
44	133	135	137	140	143	147	151	155	160	165	170	176	182	188	195	202	209	215
45	133	135	137	140	143	147	151	155	160	165	170	176	182	188	195	202	209	215
46	134	136	138	141	144	148	152	156	161	166	171	177	183	189	196	203	210	216
47	134	136	138	141	144	148	152	156	161	166	171	177	183	190	197	204	211	217
48	134	136	138	141	144	148	152	156	161	166	171	177	183	190	197	204	211	217
49	134	136	138	141	144	148	152	156	161	166	171	177	183	190	197	204	211	217
50	134	136	138	141	144	148	152	156	161	166	171	177	183	190	197	204	211	217
51	135	137	139	142	145	149	153	157	162	167	172	178	184	191	198	205	212	218
52	135	137	139	142	145	149	153	157	162	167	172	178	184	191	198	205	212	218
53	135	137	139	142	145	149	153	157	162	167	172	178	184	191	198	205	212	218
54	135	137	139	142	145	149	153	158	163	168	173	178	184	191	198	205	212	219
55 & up	135	137	139	142	145	149	153	158	163	168	173	178	184	191	198	205	212	219

TABLE 5.—STANDARD WEIGHT FOR WOMEN

Age	4 ft. 8 in.	4 ft. 9 in.	4 ft. 10 in.	4 ft. 11 in.	5 ft.	5 ft. 1 in.	5 ft. 2 in.	5 ft. 3 in.	5 ft. 4 in.	5 ft. 5 in.	5 ft. 6 in.	5 ft. 7 in.	5 ft. 8 in.	5 ft. 9 in.	5 ft. 10 in.	5 ft. 11 in.	6 ft.
16	102	104	106	108	109	111	114	117	120	124	128	132	136	139	143	148	153
17	103	105	107	109	111	113	116	119	122	125	129	133	137	140	144	149	154
18	104	106	108	110	112	114	117	120	123	126	130	134	138	141	145	150	155
19	105	107	109	111	113	115	118	121	124	127	131	135	139	142	146	151	155
20	106	108	110	112	114	116	119	122	125	128	132	136	140	143	147	151	156
21	107	109	111	113	115	117	120	123	126	129	133	137	141	144	148	152	156
22	107	109	111	113	115	117	120	123	126	129	133	137	141	145	149	153	157
23	108	110	112	114	116	118	121	124	127	130	134	138	142	146	150	153	157
24	109	111	113	115	117	119	121	124	127	130	134	138	142	146	150	154	158
25	109	111	113	115	117	119	121	124	128	131	135	139	143	147	151	154	158
26	110	112	114	116	118	120	122	125	128	131	135	139	143	147	151	155	159
27	110	112	114	116	118	120	122	125	129	132	136	140	144	148	152	155	159
28	111	113	115	117	119	121	123	126	130	133	137	141	145	149	153	156	160
29	111	113	115	117	119	121	123	126	130	133	137	141	145	149	153	156	160
30	112	114	116	118	120	122	124	127	131	134	138	142	146	150	154	157	161
31	113	115	117	119	121	123	125	128	132	135	139	143	147	151	154	157	161
32	113	115	117	119	121	123	125	128	132	136	140	144	148	152	155	158	162
33	114	116	118	120	122	124	126	129	133	137	141	145	149	153	156	159	162
34	115	117	119	121	123	125	127	130	134	138	142	146	150	154	157	160	163
35	115	117	119	121	123	125	127	130	134	138	142	146	150	154	157	160	163
36	116	118	120	122	124	126	128	131	135	139	143	147	151	155	158	161	164
37	116	118	120	122	124	126	129	132	136	140	144	148	152	156	159	162	165
38	117	119	121	123	125	127	130	133	137	141	145	149	153	157	160	163	166
39	118	120	122	124	126	128	131	134	138	142	146	150	154	158	161	164	167
40	119	121	123	125	127	129	132	135	138	142	146	150	154	158	161	164	167
41	120	122	124	126	128	130	133	136	139	143	147	151	155	159	162	165	168
42	120	122	124	126	128	130	133	136	139	143	147	151	155	159	162	166	169
43	121	123	125	127	129	131	134	137	140	144	148	152	156	160	163	167	170
44	122	124	126	128	130	132	135	138	141	145	149	153	157	161	164	168	171
45	122	124	126	128	130	132	135	138	141	145	149	153	157	161	164	168	171
46	123	125	127	129	131	133	136	139	142	146	150	154	158	162	165	169	172
47	123	125	127	129	131	133	136	139	142	146	151	155	159	163	166	170	173
48	124	126	128	130	132	134	137	140	143	147	152	156	160	164	167	171	174
49	124	126	128	130	132	134	137	140	143	147	152	156	161	165	168	172	175
50	125	127	129	131	133	135	138	141	144	148	152	156	161	165	169	173	176
51	125	127	129	131	133	135	138	141	144	148	152	157	162	166	170	174	177
52	125	127	129	131	133	135	138	141	144	148	152	157	162	166	170	174	177
53	125	127	129	131	133	135	138	141	144	148	152	157	162	166	170	174	177
54	125	127	129	131	133	135	138	141	144	148	153	158	163	167	171	174	177
55 & up	125	127	129	131	133	135	138	141	144	148	153	158	163	167	171	174	177

working all the time at a quiet, indoor job. One can eat even more often, if the appetite demands it, and yet eat less nourishing food. It is usually necessary to consult a physician in regard to proper diet. But stop decreased diet if it is weakening. Don't diet if you are under 20 or over 50 years old, or have been fat for many years. Don't reduce more than 6 to 8 pounds per month.

Signs of Strain.—We have several ways of knowing when this muscle-bone system is being put on stress too great for it. The different stages of this stress are fatigue, exhaustion, strain, sprain, dislocation or rupture, and fracture. Of these, fatigue is usually considered the natural result of work or as a "physiological end result" of work, while exhaustion or anything beyond is considered overwork or decidedly abnormal. There are some authorities, however, who consider that fatigue itself is abnormal since one can so regulate his movements, rest, food supply, and waste removal that no sense or evidence of fatigue need be present. This important observation and the whole subject of fatigue requires careful explanation.

Fatigue or "tiredness" is defined as "lessened activity due to activity," or gradual failure to turn out the same amount of work upon the same effort, while the physiologist finds that there is a "lessened amount of contractility and irritability in the muscles or tissues due to functional activity." He also finds that with a proper division between work and rest and food supply, it is almost impossible to fatigue a muscle. It would therefore look perfectly possible, and it is considered thoroughly proved that advantage can be taken of this knowledge so that a person may work and, by increasing his skill, continually increase his work, without suffering from fatigue or knowing that it is present. A study of this situation shows that fatigue is usually due to two sets of causes: those within the body, called "intrinsic" and able to be discovered by physical examinations and a study of one's symptoms and personal hygiene; and conditions of work outside of the body, called "extrinsic" causes of fatigue.[1]

The chief intrinsic or personal causes are as follows:

[1] The analysis which follows is taken, with certain modifications, from the author's monograph entitled "Occupation and Diseases of Middle Life," published by the F. A. Davis Company, Philadelphia, 1923, in Craig's "Diseases of Middle Life," vol. 1, pp. 81–174.

1. Food.—The food eaten is not of the right kind, does not furnish the proper nutrition or energy, or has not enough vitamines and salts. Perhaps the food is correct but there is disease in the digestive organs, or the person does not follow the rules of hygiene in regard to eating and food habits.

2. Oxygen.—There is some interference with the constant supply of oxygen taken from the outside air, which must get to the working cells of the body. This is judged indirectly by the presence or absence of anemia.

3. Circulation.—The heart and blood vessels, or blood, may be diseased so that there is not a sufficient supply of food and oxygen carried to the working tissues or there is not a good removal of waste products from them, which waste products must be taken away by an efficient movement of the lymph and blood returning by way of the veins.

4. Waste-removal Organs.—The bowels, kidneys, lungs, and skin must be in good condition or they are unable to remove the waste products brought to them from the working tissues.

5. Disease.—Some diseased condition is present which is taking part or most of the energy which the body is capable of producing and which is therefore not available for work. Likewise one makes himself more tired if he tries to force himself to work and also favors any disease present when he tries to use this energy which should be devoted to the staving off, checking, or cure of the disease. Chronic infections and certain deformities demand much energy, especially infections of the roots of the teeth, tonsils, gall bladder, appendix, lungs, nose cavities, ears, etc.; one of the commonest straining deformities is that of poor vision where one should be wearing glasses but is not. Physical culture in the face of physical defects and diseases is invariably harmful.

6. Stimulants.—Abuse occurs from the use of stimulants and depressants—coffee, tea, alcohol, tobacco, drugs, highly spiced foods, hot drinks, cold drinks, etc.—which soon decrease the energy supply by digging into the reserve capacity and also cause our reserved food supplies in the liver, muscles, etc. to be substituted for our regular meals. Many of these stimulants actually dull or benumb the sense of fatigue so that one who forces himself onward with stimulants does not realize the feeling of fatigue and thus cuts off one of Nature's warning signs when he is straining himself. Man needs a stimulant for every move or action which he makes, but Nature supplies the normal stimulants

herself. These are certain secretions from glands in one's own body. Two of these secretions are now well known, one called "adrenalin," made by glands located at the tops of the kidneys, and the other called "thyroxin," made by the thyroid gland in the neck, the gland which is enlarged when goiter is present. There may be other glands which supply these stimulants and which make them automatically. There is little question that if a person depends upon his own gland-made stimulants, he usually does not tire very easily and it does not take him so long to recover from fatigue as it does from the use of outside stimulants.

There is no question, however, that many people who are otherwise sluggish or cannot get enough "kick" out of their own glands of internal secretion can get onto a higher plane of work by taking coffee, tea, chocolate, and perhaps other stimulants without definite evidence of disease even in the long run. I believe, however, that such persons are not customarily eating the right form of food and that their glands of internal secretion become sluggish. Perhaps also they have a small amount of disease present someplace, which makes them desire these external stimulants. While alcohol undoubtedly has a temporary exciting influence, its effects almost at once are those of a depressant and of a cheap, unearned form of fuel; that is, a fuel which has not gone through the process of being dressed down and refined in the body itself, thus leaving the digestive organs little to do, which results in weakening them. Alcohol may be said to supply energy in a quickly available form, like a hot fire, similar to burning coke or petroleum under air-blast conditions in a furnace which is not lined or constructed for any such temperatures. At the same time that this abnormal but powerful fire is present, there is the "knock-out" effect of alcohol upon the mind by which one's will power is weakened while his imagination and emotions are given greater freedom so that he "runs away with himself," his best judgment is gone, he makes serious mistakes, "cannot keep his machine on the road," and eventually finds that his overworked muscles are fatigued and refuse to respond so that a condition of sluggishness, lessened productiveness, and mental drowsiness is brought about, as well as a fearful wear on his nervous system.

7. Interest.—One may not be interested in the work which he is doing. Perhaps anxiety or worry about outside affairs dis-

tracts him from his business. Interest in the task at hand is without doubt the chief mental stimulant to overcome fatigue. Undoubtedly this mental stimulant, aroused by interest, stirs up the glands of internal secretion and therefore prompts one to greater physical and mental effort.

8. Skill.—Newness to any work always causes a surprising amount of fatigue. As soon as a little skill is acquired, this disappears. Skill also requires a stable nervous system. Therefore, in learning a trade, avoid useless movements and wrong positions which require extra energy, that is, energy which could just as well be given to increasing one's skill and output.

9. Rest.—One who works must have rest. Rest is a state of relaxation between work efforts. Most work permits enough rest periods along with each movement to be sufficient. It is on this basis that the heart works. As a matter of fact, it is resting over half of the time. Some occupations do not permit enough short rests with the movements required. Frederick W. Taylor found that in carrying pig iron, rest periods should occupy 57 per cent of the time and actual work only 43 per cent. In a similar way practically all work requires more time for rest than for actual work effort. Some think the best way to determine the amount of rest needed for any given job is to put it up to the worker himself, after he has been taught the shortest and quickest movements, and then offer him some prize or other incentive such as piecework to get the job done. By this means his own instinct is brought normally into play and will regulate his work efforts and rest periods. In general, periods of rest should so interrupt periods of work throughout the day as to keep from digging into one's reserve capacity of stored fuel and enable one to "quit fresh" instead of "so tired." This is the basis of the soldier's daily life. It seems a good practical rule that if the meal following a work spell does not fully restore capacity for work, then that work has been unduly fatiguing. In some work, meals or light lunches should come every 2 or 3 hours, because the amount of food required is more than should be loaded into the stomach at 5- or 6-hour periods and also is more than the heart, blood vessels and muscles should try to keep moving in massive amounts.

10. The Amount of Sleep.—The middle-aged worker who is in normal health requires about 7 to 8 hours of sleep, always at night, if possible, to meet his requirements. Earlier in life he

requires 8 or 9 hours; as he grows older, as little as 6 to 6½ hours may be sufficient so far as sleep itself goes. As old age approaches, more sleep is again demanded. One must realize, however, that there is a difference between lying down and relaxing, and in actually going to sleep. An extra hour or so should therefore be added to the actual time for sleep.

Sleep is the "rest period" for the nervous system. About the same amount is required whether one works or loafs; hence it has little to do with our activities. Any undue nervous strain, even involving our movements, will demand more sleep for the needed rest of the nervous system.

It will be noted from the above list of personal factors which cause fatigue that the first four—food, oxygen, circulation, and elimination—obey physical laws similar to those required for a furnace; even the fifth one, disease, corresponds to a damaged motor. The last five, however, are peculiar to the body itself and obey vital laws. These vital laws are quite the opposite, sometimes, of physical laws, especially the one where it is seen that the body improves on use while an engine tends to wear out.

There are a number of extrinsic or external things which may lead to fatigue. As a rule these are much less important than the intrinsic or personal things I have just described. This is because they are so much more easily noticed and also much more apt to become the cause of complaint. The author goes so far as to say that if all the things above listed which cause fatigue in the person himself are properly supervised and regulated, it is quite difficult to fatigue the human body by the external factors, because these external things must have to exist in such plainly dangerous amounts (not necessarily plain to the ignorant) as to cut down much work effort under them. The chief external things may, then, be summed up as follows:

1. Hard Work.—This is such a relative term as often to mean little. It is hard to estimate it by any scientific method. For the present, the experience of the group of workers themselves as interpreted by a trained observer must be taken.

2. Night Work.—This is undoubtedly abnormal to the human being, who is in no sense a nocturnal animal and whose physical powers by nature reach a low ebb between the midnight hour and daybreak. For instance, blood pressure customarily reaches a low ebb about 3 to 4 a. m.

3. Long Hours.—This, again, is a very relative question, but it undoubtedly affects physical workers more than mental workers. It is probably natural and logical, all around, that 8 to 10 hours per day is enough for physical or manual work, while mental or brain work may use with safety from 10 to 14 hours per day.

4. Piece Work.—This is a matter of adaptation, of skill and properly spaced rest periods, perhaps a rest period for each set of muscles as often as every 30 seconds in some processes. Since piecework furnishes a goal, it arouses interest, counteracts monotony, and substitutes a normal stimulant for what is too often the case, abnormal and harmful stimulants.

5. Rhythm.—Rhythm or swing at work must be fitted more or less to the given worker, and if upset or interfered with, causes dissatisfaction while sooner or later an occupational "neurosis," cramp or spasm may result.

6. Monotony.—This is also a clearly relative question, depending more upon one's level of intelligence, ambition, and incentive than the class of work. What is plainly monotonous and dull becomes irksome and is soon dropped, but the same process may prove absorbingly interesting or satisfying to another. Hence we naturally select our jobs, more or less, and if our employers are wise, they will let us develop our preferences and thereby do the best work. Mental tests and physiological tests will often determine this in short order.

7. Distractions.—Disturbances of all kinds, common noise, vibration of floor or building, glaring lights, interruptions, etc., these take their day's share of attention and, therefore, of energy to meet.

8. Forced Inactivity.—All work while seated or any work requiring very little bodily movement, including close eyework, produces fatigue because there is not enough circulation to remove waste products from the various organs and parts of the body; thus the ashes may be said to heap up and shut off the draft and crowd the fuel box so that sluggishness results. Furthermore, this kind of work usually means that some part of the body, like the eyes or hands are being worked harder than ever and producing lots of waste products which the general circulation is not getting rid of. Hence, we have here a potent cause of fatigue. Inactive workers need outdoor exercises of light character in fresh air instead of physical culture or games in

gymnasiums. The "daily dozen" should be taken in a cool room and followed by a sponge-down or short bath.

9. Incorrect Postures.—Work requiring incorrect positions requires extra energy and also gradually promotes deformities of the body.

10. Constant Standing.—This requires extra energy to hold the back correct and keep the legs extended. This amounts to considerable in a day's time. It is usually easily solved by providing seats to be used at the option of workers. The writer thoroughly believes that any management which prohibits the use of seats during work hours for workers who otherwise constantly stand, is short sighted and working against its own interest in getting out production. There is no evidence that relaxation itself, while sitting, tends to decrease work on a "stand-up" job. Peculiar kinds of chairs and seats for different jobs, even some which move back and forth upon tracks, may be used for different processes. The requirements of a good seat are a low back, fitting the small of the back but ending below the shoulder blades, so that a person may lean back at least every half hour for a moment's relaxation. The only set of muscles in the body which is arranged to be on the job all day is that of the neck muscles. Here are found the most massive muscles in the body for the amount of work they have to perform, that is, to hold the head up. It is also known that none of these are constantly on the job but that they keep changing off with each other. The next set of muscles for endurance are the back muscles, and by experience these require relaxation at least every half hour and preferably less. They may be partially relaxed, as between themselves, while standing, and by shifting the weight from one foot to the other. The whole mass of back muscles, however, needs rest as stated at least once every half hour.

11. Incorrect Seating.—Seats should not cause a slump or kink of the body and a transverse crease across the stomach in order to sit comfortably on a chair. There is no question, however, that the slump posture is the most restful and requires the least amount of energy to maintain, but the worker should choose the lesser of two evils and prevent round shoulders and weakened chest and other deformities by keeping erect as a habit, sloughing or slumping only at intervals, for more complete rest.

12. Prolonged Strain.—Straining efforts are undoubtedly the most important causes of fatigue known and must be prevented

by stopping the strain at intervals and relaxing. Otherwise an abnormal amount of waste products from fatigue are produced, which appear able to clog up the muscles themselves, after which a kinking may take place, such as lumbago, stiff neck, "Charley horse," and other forms of stiffness and pain on attempting to move the overstrained part. One succeeds much better in carrying 100 pounds up three flights of stairs by carrying it up a part of the way at a time (gaged by his muscular powers) than by an attempt to complete the job in one effort. It would be better still if he were to divide the load into 50-pound weights and carry each up separately. The divided method in either case will probably not cause strain, and so undue fatigue does not result. The single long effort may produce not only fatigue but exhaustion, so that the person may feel it for the rest of the day and necessarily his working powers are seriously cut down.

13. Bad Ventilation.—Watch especially overheated work rooms where the air is stagnant or changes little. This causes sweating and extra effort on the part of the heart to move the blood to the surface of the skin faster to promote a cooling effect. Strictly speaking all sweating with visible drops is physiologically uneconomical and the person would have more energy for something else if the sweating could be stopped. When one is sweating or drowsy, stirring the air up with a fan, even the old-fashioned hand fan, is a fine stimulant and a great relief.

The New York Ventilation Commission came to the conclusion that 68°F. is a *critical temperature* which, if exceeded, as in school rooms, leads to increased illness, especially from respiratory diseases (see p. 82). A quiet coolness is preferably to a *drafty* air exchange. Keep a thermometer with "68°F." plainly marked upon it, in every work room. Ventilation is of course bad when the air is polluted with poisonous gases, fumes, or smoke which should be removed at their sources rather than by trying to dilute them in the breathing atmosphere. More air exchange is then obviously necessary, but 70°F. should not be exceeded whenever the outside temperature is lower than this.

14. Lighting.—Poor lighting produces much strain of the eyes and, therefore, fatigue. It is also very often responsible for accidents. Bright lighting allows one to see quickly as well as plainly and therefore to do his work faster and more accurately. Hence the same effort produces more output. Bright lights staring one in the face are distracting and very fatiguing to the eyes. Where

they cannot be placed in a correct position so as not to cause glare, the worker can protect himself very much by the wearing of an eye shade. The eye shade like the hand fan is not appreciated enough as a genuine saver of energy otherwise lost by strain.

15. Sanitation Provisions.—Unless toilets, drinking places, and washing places are convenient and also decent and clean, workers tend not to go to them when they should. This leads to unnecessary constipation, failure to drink enough water, and personal uncleanliness, all of which contribute directly to fatigue.

16. Traveling from home to the work place and return requires energy. Weather exposure does also. These contribute directly to the day's toll on the day's energy supply and must be reckoned in as a part of the total day's effort. Workers should live reasonably close to their place of employment unless transportation facilities are very good.

"High Signs" of Fatigue.—When do we know that the day's work is too hard or fatiguing? There are so many conditions which give rise to the same symptoms of "tiredness" as work itself does, that this question is more difficult to answer in the individual case than in a group of workers:

1. Many workers complaining of "tired feeling" at the close of the work periods.

2. Many health complaints, much actual sickness, requests for time off, too many quitting, and a correspondingly high "labor turnover" in the work place.

3. Fagged appearance of numbers of workers.

4. Too much spoiled work, not necessarily a decreased amount of work, except when measured by the week or month.

5. Less desire to work; loafing; disloyalty.

6. More precisely, an examination of the workers or an inspection of the work place, usually both, shows that many of the "intrinsic" and "extrinsic" causes of fatigue, as described above, are present.

The Effects of Fatigue.—We look for the most pronounced effects of fatigue in persons approaching midlife and later. Chiefly to be mentioned are an increased likelihood of infections, particularly in the breathing system and in the skin, but there is some evidence that, in the case of pneumonia, at least, fatigue causes a "hardening" provided the person is otherwise well, and actually prevents pneumonia. However, rheumatism, nervous breakdown, neurasthenia, and hysteria often result. It is said

that 74 per cent of industrial neuroses (tailor's cramp, writer's cramp, stone-chipper's cramp, etc.) occur among expert or skilled workers. It is probable that the disease diabetes, when it appears in adult life, is partially caused by fatigue. Heart trouble such as "irritable heart" and the so-called "effort syndrome" occur, principally, when a worker tries to do a more strenuous job than he is used to. Some workers appear to get a small amount of anemia from overly hard work. Dr. Frederic S. Lee[1] lays stress on "borderland ills" in general as due to fatigue. It is plain that fatigue bears a close relation to the cause of accidents. In women it is said to result in menstrual disorders, constipation, and digestive disturbances. Also, in overdoing physical culture exercises, girls and women are apt to veer to the

FIG. 36.—It took an electrotyper 16 years to wear the finger prints into the hickory handle shown here, but by that time he had developed a partial paralysis of his hand and arm, the result of chronic fatigue.

masculine type and prove physically less capable of bearing children and nursing them as successfully and free from danger as their more effeminately developed sisters. Statistics show that between 20 and 55 years of age, working women have more illness than men, often losing twice the amount of time from sickness.

The results of fatigue may be summed up thus:

1. Immediate results: less accuracy in workmanship; "puttering"; less enthusiasm or interest; lowered morale; moodiness; health complaints, varying in different workers according to their "weak points." The amount of output may be the same, but the workmanship is not as good.

[1] "Occupational Diseases Due to Fatigue," in KOBER and HAYHURST'S "Industrial Health," P. Blakiston's Son and Company, pp. 737–762, Philadelphia, 1924. See also "Occupational Neuroses," by E. E. SOUTHARD and H. C. SOLOMON, same volume, pp. 763–789.

2. Results in the course of a few days or weeks: slouching positions at work and also a "don't care" mental attitude; loafing often unnoticed by the worker himself, a desire to take time off or change jobs; and sick spells affecting different workers according to their "weak points."

3. Results after years: workers changing jobs or dropping their regular trades for "something easier" although at less pay. This is so common in some industries and trades which ought to be followed for life that comparatively few workers are found in them over 40 and especially over 50 years of age. The workers themselves, however, show actual body deformities, chief among which are those of the back, shoulders, feet, and legs. A general condition of poor nutrition may be present, but not necessarily a loss of weight; in fact some are even fat, but muscles are weaker, and some anemia may be present.

There is less endurance, more bad temper and irritability, and a continually changing disposition with a great deal of indefinite complaints about not feeling well (neurasthenia). Persons often look much older than they are. There is a marked loss of that independence which was so characteristic of younger years and in its place have come loss of ambition, sheep-like submission, sometimes talkativeness and gentle bluffing but with no "backbone." A physical examination very often shows that some chronic disease is present.

Severe Strains.—As long as nothing snaps or gives away at the time, we usually call any bad results simply fatigue or tiredness. However, one may gradually strain himself until a condition called "exhaustion" follows, in which he is not only using up the food stored in his muscles for the purpose of work and supplying energy, but he is actually using up muscle substance itself just as in starvation. This results in loss of weight, anemia, and perhaps actual wasting of the body while, of course, the victim feels very much worn out. Should a part of the body be severely taxed, a "strain" results with pain and suffering. This strain may not be noticed until the next day and usually results in what is incorrectly called "rheumatism." The baseball player calls it "Charley-horse" (see p. 169). A sprain is said to have occurred when there is an actual tearing or rupture of tissues, muscles or tendons. This may be shown by a sharp, stinging pain, as in the arm, followed by a knot under the skin. This knot may be composed of muscle fibers or a tendon which has torn

loose, or, if it occurs about the groin, it may be a rupture (hernia). Sprains are common in the ankles, wrists, finger joints, and shoulders. They are much less common in the back where a "strain" is more apt to occur than a "sprain." When parts are not only ruptured but shoved out of position and stay there, a dislocation is said to be present. The shoulder is the commonest joint to be dislocated.

Signs of Health.—The general signs of health in the bones and muscles can be gaged roughly as follows:

1. Good tone is a condition in which a person can withstand a certain strain without developing a soreness. Practicing up leads to this condition.

2. Shivering is a sign of health but should not be confused with chills or "fever and ague" when one can see that he also is sick, usually has a headache, etc.

3. The size of development is another method of judging the fitness of muscles.

4. The physician will tap the knee or elbow and other parts and see what the "reflexes" are.

5. One should always be able to tell, even with his eyes closed, the position of any part of his body; also, whether his hand is open or closed.

6. One should be able to judge the weight of an object fairly accurately and also the shape and size of it, as whether it is a nickel or half dollar he holds in his hand.

7. Endurance or ability to "hang on" is a better sign of health than straight-out "brute" strength.

8. Quickness and accuracy of movements speak for good health as well as skill.

9. The extent to which a joint can be bent is a test for a given joint, but this depends first upon the age of the person and thereafter on use, in the absence of disease.

10. Joints should move without any grating sound or even any grating feeling when one places the hand over the joint.

11. Of course there should be no pain when moving any joint. Likewise tendons and muscles should move or contract without grating or pain.

12. There should be an absence of unnecessary movements made to accomplish any work; bad habits in learning have much to do with this, but fatigue will soon call forth additional and unusual movements.

13. There should be no ruptures, varicose veins, and no deformities; also no need for mechanical supports like crutches, belts, splints, wrist guards, elastic stockings, supporting corsets, etc.

14. Again, one should not be "fat" nor yet "too thin."

15. Finally, one should recover very quickly from fatigue upon eating or after a little rest, and he should be able to relax easily from any stress or strain.

The common ailments of the bone and muscle system are those known as rheumatism, ruptures, paralyses, and deformities.

Rheumatism.—There are many forms of rheumatism, so that the term itself may mean almost any ache, pain, or tenderness. *True rheumatism* or *inflammatory rheumatism* is an infection of the joints, muscle tendons, or muscles, which, if acute, shows redness, swelling, fever, tenderness, and (extreme) pain on movement. When not so severe, it shows some swelling, stiffness, pain, and more or less aching. The heart is nearly always affected and in danger, and is a principal reason for not working when inflammatory rheumatism is present. Instead, rest in bed with medical and perhaps nursing treatment is needed. In *chronic rheumatism* the joints may overgrow and become very conspicuous, making the hands or other parts look ungainly and deformed. Sometimes the back, hip, knee, elbow, ankle, or shoulder is enlarged and made practically stiff (rheumatoid arthritis). This form of rheumatism is undoubtedly due to a germ infection which gets into the body through bad teeth, bad tonsils, and during colds and infections. It always requires medical advice and patient treatment; oftentimes if treated by massage or "adjustments" and "manipulations," it gets rapidly worse, because of the rule so frequently stressed already in these pages that *inflamed and diseased parts must not be rubbed or moved or exercised.* There are, of course, times when slight "counter irritation" is favorable, but it takes the expert judgment of a well-qualified physician to know when.

Tuberculosis of the joints, humpback, acute infections of joints, and the joint deformities following infantile paralysis are, of course, not true rheumatism.

A common form of rheumatism is due to the venereal disease gonorrhea or "clap." Very often the germs of this disease get into the blood and lodge in the joints, sometimes one but usually two or three joints. They cause rapid swelling, severe pain,

and the formation of a lot of pus, and unless prompt and skilled treatment is secured, permanent stiffness will usually result. Syphilis in the second and third stages is a very common cause of aching in the body and of pains in the limbs and back like rheumatism. These aches and pains are worse at night when "the very bones seem to ache."

Another so-called "rheumatism" which is very common is that due to *sudden overuse* of the part. This fact is often overlooked. It may be followed after a few days by an inflammation of a leader, or tendon sheath, or one or more of the lymph sacs (bursae), which are located between muscle tendons and bones to prevent friction. These inflamed sheaths and bursae swell up. They are most frequent around the shoulder, elbow, wrist, and the knee. Sometimes they press upon the nerves so that the parts lower down may ache and pain, and become numb or even paralyzed. This frequently happens, for instance, in the case of a woman who undertakes to clean windows or walls when she is not used to it or to a man who tries to do his own painting when not used to it. It usually takes 2 or 3 days before this condition is noticed. I have known persons to be laid up for 3 months with aching and partially paralyzed arms or hands from this cause.

On the other hand, even those who work steadily at a job often develop enlargements of these bursae and tendon sheaths, such as "housemaid's knee" from working on the knees, or "miner's beat hand," "beat elbow," etc., from constant pressure of tools or wrong positions at work. Stiffness of the wrist joint (tenosynovitis) is a very common affliction in persons who start some job or return to a job which requires constant twisting or turning of the wrist. Lumps or ganglions often appear upon the back of the hands or wrists of stenographers, seamstresses, pianists, etc. These are all occupational diseases and should be paid compensation and medical bills if they cause inability to work. Sometimes tuberculosis, syphilis, or rheumatism is at the bottom of these troubles. Prevention lies in going at things more easily and resting frequently until one has become "broken in." Wearing a splint or other support such as a wrist band often aids weak wrists. Remember that even though you have a trade and are skilled at it, when you take it up after a layoff, "start in easy."

Backache, or lumbago, stiff back, or "kink" in the back, is due to many causes. Often it is an inflammation of low-grade

character in the joint or joints between the backbone and pelvis. Rheumatism may be present. A cold may settle in the back. Bone disease may be starting. Frequently it is stiffening of the muscles in the back, following some apparently simple strain. Even the changing from an accustomed seat or chair to another with a little different position for the back may produce it, the pain coming on after a day or so and remaining for days if the new position is maintained. A change of shoes to high or low heels causes a different strain on the muscles of the back, often followed by pain or "lumbago." Leaning over farther in one's work than accustomed to will do the same thing. Occupational poisons causing anemia (lead, benzol, carbon bisulphide, gasoline) usually cause backache. Pain in the back is very rarely due to pinching of the nerve roots in the spinal column, in spite of advertisements to the contrary and, when so, produces an entirely different set of symptoms from those of backache. Fallen organs in the stomach region and pelvis and congestion of the organs usually cause a drag on the back with pain. Heavy lifting, when overheated or not accustomed to it, often causes a "kink in the back" which disables one at once. Lumbago may be as disabling, as far as work is concerned, as a broken leg, because of the time it often lays one up.

Treatment.—There is probably no other condition where people tend to treat themselves and yet where there is more benefit to be gotten by consulting a physician or perhaps an orthopedic surgeon than "lumbago." Home remedies, however, are often helpful. Among the best of these is the rubbing on of artificial oil of wintergreen (methyl salicylate) several times a day. One may also take, for a couple of days, 10 to 15 drops of this oil two or three times a day in capsules or on a lump of sugar. Aspirin, or acetyl-salicylic acid, which is usually much cheaper, may be taken internally for a few days. Good liniments are as follows: belladonna liniment; chloroform liniment; turpentine liniment; soap liniment; "ABC liniment" (aconite, belladonna, and chloroform)—all obtainable in small amounts at the drug store. A belladonna plaster often gives relief. In fact, simply putting on wide strips of adhesive plaster may give relief. An old-fashioned remedy which is sometimes effective is to have someone iron the back with a very warm flatiron, preferably over a piece of ordinary butcher's brown paper. One should lean over a table or lounge while being "ironed." "Baking" and

hot-air treatments often give great relief to lumbago, sciatica, wry neck, and stiff, painful joints, and muscles in general. Some claim remarkable effects from eating a lemon every day, peeling and all. This should be taken preferably on an empty stomach and at different times during the day, a little at a time. The backache so common among women and girls can often be relieved by the "knee-chest" position in which one rests on her knees and chest with head turned to one side; 5 to 10 minutes of this position on arising in the morning and on going to bed at night is advised.

Sciatica or sciatic rheumatism has a number of important causes and requires a careful diagnosis to find whether posture, injury, disease, exposure, pressure, or poisons (many times of occupational nature) may be the cause. It should be treated along the same general lines as just stated for lumbago. Where one cannot get reasonable relief from his own attempts within a few days, a physician should be seen.

Ruptures occur most commonly in the groins. Except where one has been violently hit, which is rarely the cause of a rupture, the condition favorable to rupture has been present since birth; all that has been necessary to force the rupture through has been some straining effort. As one gets older, his tissues thin out and he has a greater liability to rupture. I have seen very old people who had half a dozen or more ruptures because they had thinned out so that there were not enough muscles and strong connective tissue left to keep the inside parts in place. Ruptures also occur in fat persons because fat has taken the place of muscles and tendons, and of course it is not so strong a support to hold back the organs during a straining effort. Even varicose veins must be looked upon as ruptures of supporting tissues around blood vessels. Ruptures are especially apt to occur after one has been sick. Without realizing the weakness of his supporting tissues, he attempts some straining effort which results in a rupture.

There is no medical cure for ruptures. They can be more or less held in place by trusses and special belts but there is no such thing as absorbing them, and it is usually dangerous to allow any injections to be made into them. Since a rupture is due to a slit in the stiff fibrous tissue within and a bulging of a gut or other organ through the slit, it is rarely possible to cure the condition even when the gut has slipped back into the abdominal cavity, except by a surgical operation to close up the slit. This, nowadays, is so

well understood and so simple that it has very little danger, and should always be done, provided the physician or surgeon advises it.

Palsy or paralysis may be prevented by understanding its causes. I have mentioned the partial weakness and sometimes nearly complete paralysis which is due to undertaking some work to which one is not accustomed when he goes at it too vigorously.

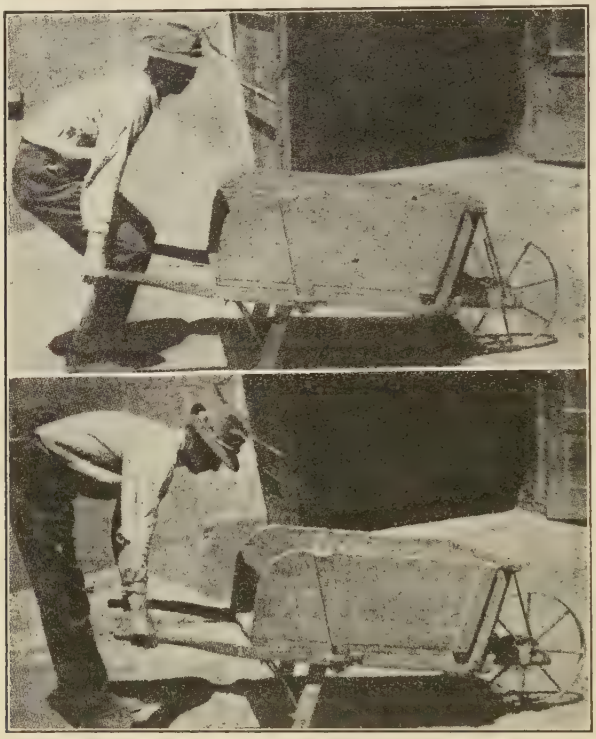


FIG. 37.—Lift as in the upper picture, not as in the lower picture. (*Dr. R. W. Corwin in Hygeia.*)

Such is a simple, temporary affliction from which one always recovers within a few days to a few months.

Paralysis may be caused by something pressing on a nerve, as in "Saturday night paralysis" where a drunken person sits in a chair for several hours with his arm or arms thrown over the back of the chair. Anything pressing severely on the nerves for even an hour or so may produce paralysis from which one may not

recover for months. Paralysis is very easily produced by a severe injury or by the cutting of a nerve.

When a part of the body is not used for some reason or other, the nerves to it gradually cease to supply it with energy for movement and a more or less complete paralysis follows.

Hysterical persons sometimes act as though they were paralyzed, but the physician can usually detect the malingering very readily. Also any paralysis which is not a true one disappears when one is asleep or is put under an anesthetic.

A paralysis due to inflammation of the nerves is often caused by alcoholism and involves especially the legs. It is more frequently seen in women than in men and is sometimes produced by the use of patent medicines containing alcohol. I have known of women who have had severe alcoholic paralysis (multiple neuritis) from taking certain patent medicines and from the use of so-called kidney remedies containing juniper and gin, who never dreamed they were taking a rich alcoholic drink. Some of these women spent as much as 6 months in bed or in a wheel chair.

One of the dreadful consequences of syphilis is a paralytic or apoplectic stroke (which is almost the same thing). It is said that most paralytic strokes which occur in persons under 40 years of age are due to syphilis. These may be nearly completely recovered from but usually leave the person unable to follow his trade, and another stroke or two may end his days. Persons over 50 years of age become more liable to apoplectic strokes as each year passes, but we are certain that most of these could be prevented or at least put well beyond 70 years of age if a visit to a physician for a good physical examination each year were made by all persons who have reached 40 years of age. By this means, growing weaknesses would be found early enough to check them (see High Blood Pressure, Hardened Arteries, and Bright's Disease).

Paralysis may follow an attack of meningitis. This inflammation of the brain coverings usually leaves some permanent marks, if one is fortunate enough to survive the attack. Epidemic meningitis was very prevalent among the troops during the war, especially following the influenza epidemic.

Infantile paralysis is familiar to all of us, leaving its little victims usually permanently paralyzed in one or both legs or arms. Very much can now be done for these cases, especially while they are children. There are many records of helpless

cripples of this type who have been enabled to walk and to get about quite well by the careful work of the orthopedic surgeon or of the clinic. Paralyses are often due to diseases of the spine which affect the coverings of the spinal cord and produce spinal meningitis. Tuberculosis is one of the commonest causes of spinal meningitis.

Inflammations about the back of the nose, and of the ears and in the bone behind the ear (the mastoid) may cause paralysis, especially, of the face. "Bell's palsy" is a form due to a cold which settles in and about the ear. I once examined a young glassblower who thought he had been poisoned from arsenic in the glass, but he had "Bell's palsy" from exposure to cold drafts. This is nearly always recovered from in the course of a couple of months. Usually only one side of the face is paralyzed.

Diphtheria may cause paralysis, especially when one is quite resistant to the disease and is not treated soon enough with antitoxin. This is often the case in youths and adult persons. The paralysis is apt to come on several weeks after the diphtheria is over and, if the person has been given an injection of antitoxin, he is sometimes apt to think the antitoxin caused the paralysis. The fact is that the antitoxin probably saved his life but was not given in time to stop the production of a secondary poison (toxone), which occurs in dragged-out cases of the disease and finally shows its effect as a slowly spreading paralysis.

I once knew a young athlete who had a paralysis of this kind, whose palate first became paralyzed so that he could not swallow without food coming back through his nose. The paralysis spread to his legs and arms, and for a couple of days it looked as if he would even cease breathing. He was this way nearly all summer. There is no treatment known to counteract this paralysis, but, happily, diphtheria paralysis is rarely fatal. The young man in question recovered in about 6 months. Ten years afterward when he was 25 years old he wrote me that he had been the leading athlete for short-distance running in the Central Athletic Club of Chicago for several years and had been sent by the club to South America and to Paris, France, often winning prizes. This shows how completely one may recover from diphtheria paralysis. However, one is foolish to allow a sore throat to go along for a week and then discover it is due to diphtheria, because even if he saves his life by getting antitoxin, this paralysis may come on.

Any acute infectious disease may have paralysis in its course. A person suffering from pneumonia, for example, or typhoid fever, may become more or less suddenly paralyzed as in one arm or one leg, or more extensively.

Locomotor ataxia produces a peculiar form of paralysis in which the person has no feeling in his limbs but still can walk and use them after a fashion. The feeling is gone so completely that a case is on record where a carpenter actually drove several nails through a board into his shin and did not know it nor had he any pain when the board had to be pried loose with a crowbar. This disease is a late stage of syphilis.

Deformities.—Certain deformities can be prevented, especially those due to faulty habits. Round shoulders or stoop shoulders may be due to bad feeding when a child (see Rickets) or due to the slouch habit which is often acquired in school where seats are too high and desks too low. One can be trained out of the stoop-shoulder posture by walking and standing with the chin drawn in, or as a physician friend of mine says, by trying to touch the top of his head to some imaginary object.

One shoulder is commonly larger than the other when a person uses that arm more than the other; likewise, that shoulder tends to be the lowest since it is pulled down by the more powerful muscles connecting it to the chest. One hip may stick out farther than the other. This may come from the habit of carrying things (for instance, school books while in the years of childhood) always under one arm and resting them on the hip. Careless persons are apt to stand that way. This deformity acquired in girlhood may interfere with childbirth when a grown woman. What should be considered a deformity is decreased expansion of the chest in breathing, which, as explained in the chapter on the Breathing System, is a deformity often leading to tuberculosis and favoring heart and lung diseases.

Spinal Dislocations.—A "deviated" or slightly twisted spine (skoliosis) is so common that some anatomists have found it in 90 per cent of persons. We are apt to think that when a condition is as common as this, it must be normal and that "straight" or gracefully curved spines without twisting to one side or the other are abnormal, but such is not the case. To repeat, these slightly crooked spines cause no symptoms but they cause many people to spend money on spinal adjustments and similar treatments which are claimed by various cults and quacks to be the

cause of all manner of diseases in other parts of the body. The pinching of nerves by being caught between the ribs or bony processes of the spine is among the rarest causes of disease known.

The spinal projections show plainly under the skin when one "bows" or "rounds" his back. Most persons' spines will show one or more of the spinal projections sunk below the level of the others or slightly off to one side (deviated) or sticking out too prominently. None of these bones out of place cause disease nor do they injure the spinal nerves. These slightly twisted spines, however, could and should be prevented for the sake of a good posture; much can be done while at work by using chairs or stools which have back rests and also by getting rest for the back, in work requiring standing still, by having a chair or stool at hand. When a certain area in the back feels sore to the touch, it may be due to hysteria or, more rarely, to actual disease of the spine, usually tuberculosis. A skilled examination is necessary to determine the real cause and start the proper treatment.

Fallen Organs.—A falling of all of the organs in the abdominal cavity sometimes occurs but without marked distress or any shortening of life. It is often accompanied by backache, which is relieved by wearing an abdominal supporter or belt. It is most frequent in women who have borne a number of children and in those who have large ruptures and other abdominal disease of various kinds. The wearing of a stomach supporter gives a certain amount of relief, while occasionally operations are performed to put organs back in their places.

Deformities of the pelvis, the bony rim of the lower part of the body, by which it is narrowed or flattened, are usually the result of rickets in childhood and are very serious for young women because of interference with childbirth. This is the usual reason for "Caesarian operations" or "sections" on women (cutting through the abdominal wall) for the removal of the living child in order to save the lives of both. Reports show that, with modern methods, more than 97 per cent of mothers and 95 per cent of babies are saved by "Caesarian sections" who would otherwise die—one or the other, or both. Cases are on record where a woman has had several normal children born in this way. It is said that Caesar, the great Roman Emperor, was born this way.

Deformities of the legs, in which they are bent or bowed, "knock-kneed" and "bow-legged," are usually due to rickets in childhood, but sometimes to long-standing illness which is not severe enough to keep the growing child in bed so that the weight of the body curves or deforms the legs. Rickets is a disease due to malnutrition, which, in turn, is usually due to lack of proper feeding and enough exposure to sunlight and daylight in the first two or three years of life. Investigations have shown that recently in New York City a majority of the babies in the tenement districts had rickets, the colored children especially.

To prevent deformities in general, persons are advised to lie on the floor more. Stretch out at full length. It promotes "tallness," and also rest. One can read with comfort lying on

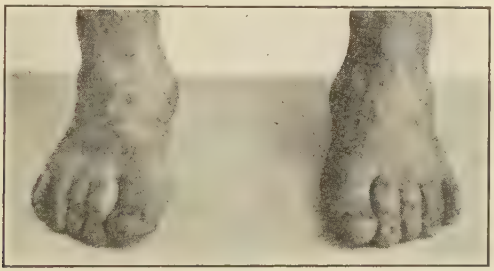


FIG. 38.—The feet in proper position for strength. (*Capt. J. R. Harris, U. S. A., in the Military Surgeon.*)

the stomach with head supported by elbows and hands. Lying at full length means more relaxation and less permanent strain. Childhood is the best time to prevent deformities.

The feet are so commonly deformed or give trouble that a special discussion should be devoted to the subject. Army statistics indicated that 62 per cent of the men examined for war service were suffering from foot trouble or had flatfoot. Lieutenant Colonel Harris, who has given special attention to the subject for years, made a careful examination of Cornell University students, finding that 90 per cent of the young men had enough "splay foot," that is, the feet turned outward, to cause some muscular and nerve strain, although the majority of them did not realize that their nervous and tired feelings were partly due to this cause. Compression by tight shoes probably causes most of the deformities of the feet. Tight socks, inside even the best of shoes, will produce the same condition. A person should wear his shoe soles

out on the outer side instead of on the inner or big-toe side of the foot. Lying in bed while sick or for any reason over a long period of time, especially if the bed clothes weigh down on the feet, often produces a foot-drop and perhaps a permanent pulling up of the heels. This may happen to one at any time in life. Whenever one is laid up for more than a few days, the limbs should be massaged and the bed covers raised over a low hoop to prevent this deformity.

One of the most serious troubles of the feet is called "flatfoot." People commonly call it "rheumatism of the feet," "weak ankles," and "gout," but the pain is due to strained ligaments and tendons and may extend to the legs and back, especially *while the arches are falling.* This may last from a few weeks to a

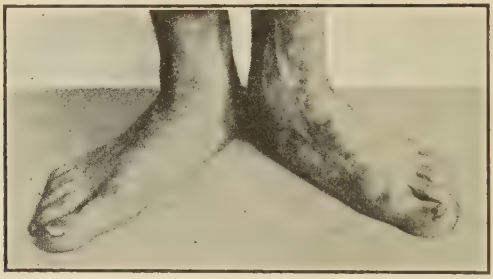


Fig. 39.—Fallen arches and flat feet. Note also how the feet are splayed out. (*Capt. J. R. Harris, U. S. A., in the Military Surgeon.*)

few years. After the arches have fallen, new adjustments of bones and ligaments take place so that the former complaints of "rheumatism," "gout," and even "lumbago" disappear. In flatfoot the long arch of the foot is broken down so that on walking across the floor with wet feet one sees too much or too wide an imprint of the foot on the floor.

Flatfoot has several causes. The principal one is that of getting onto the feet too soon after a spell of sickness as, for example, a siege of scarlet fever in a child, or of rheumatism, typhoid fever, or some disabling injury. The ligaments of the foot which hold the bones together are too weak to support the weight of the body as soon as the individual wishes to walk on them. Almost as common a cause of flatfoot is walking "flunky footed" and standing "splay footed," in both of which habits the feet are turned outward. Both of these habits were once forced upon the common people, according to history, as a sign of submission and

also because one could bow more gracefully with the toes pointed apart than with them pointing straight to the front. A person salaaming a king or potentate would look awkward doing it with his toes pointed frontward. Another very common cause of flatfoot is shoes which do not have a straight inner edge but turn outwards. Practically all pointed-toe shoes do this. Flatfoot is also due to injuries or disease of the foot itself and sometimes follows jumping from a height.

With shoes on, an easy test for flatfoot or weak arches is to stand with the feet touching at heels and toes. If normal, two fingers should easily pass between the ankles, or, if barefoot, at least the thumb. If you will draw a straight line with a piece of chalk down the center of the front of your shoe or ankle to the

FIG. 40.—The pair of footprints on the left show a bad condition of flat feet. Complete correction was effected in 5 months' time as shown by the foot prints on the right. (*Prof. Jane McGownd in Hygeia.*)

toes, it will indicate the direction which the weight of your body takes in standing correctly—toes to the front. The line will strike the middle of the top of the instep, or the top of the foot, the keystone of the arch of the foot. The middle of the top of an arch (the keystone) is always the strongest point and should therefore get the greatest weight. If you turn your foot outward, however, you will see that the line, to be straight, will have to be changed so as to pass over the inside of the ankle, thus removing the weight from the top of the arch or keystone to the inner edge of it, a much weaker place.

There are three stages of flatfoot commonly recognized. In the first stage, the foot hurts or pains more on the inner side below the ankle and on the ball of the foot, underneath. The pain stops as a rule when one gets off the feet. Therefore, it is

first noticed a little while after getting up in the morning and after standing until tired. The pain may extend halfway or more to the knees. It can be seen that the wet foot gives too large a mark on the floor, but when one is off the foot the arch recoils to its normal position. Still the foot is usually painful while handling or pressing it. Beginning flatfoot is shown also by toeing outward while the heel portion also swings outward, causing the inside of the ankle to bulge. This stage passes into the next or second stage within a few days to a few months, and represents the time when one should keep off the feet or have them strapped and the arches held in the proper position, a matter for a physician or surgeon to supervise. Certain exercises and massage will greatly benefit them during this period. In this stage of flatfoot the arch is down pretty well but can be pushed back into place

FIG. 41.—"Duck waddle" (left) and "scout foot" (right). (*Hygeia.*)

so that the shape of the foot can be more or less reformed in the hands of the physician. In this stage of flatfoot there may be little if any pain in the feet but pain in the legs and small of the back. Much "lumbago" and "womb trouble" with backaches is really fallen arches of the feet. These back pains are due to a readjustment of the balancing muscles to make up for the slight disturbance of balance caused by the falling arches. The third stage of flatfoot shows the arch permanently down all of the time, usually the bones of the foot stiffened in that position, and the foot rather big and clumsy looking with the toes pointed very much outwards. This is very commonly seen in waiters, porters, and others who stand a great deal or who carry loads in their hands and arms. There is little pain in this stage; if anywhere, it is apt to be high up in the back or in the neck. Such persons can stand or walk quite efficiently but may not have long endur-

ance. The Army has long known that they make poor soldiers; so they were not accepted by the draft in the recent war.

It is foolish for a person to try to cure or relieve flatfoot by the wearing of arches or special shoes or various adjustments except when under the guidance of a physician trained in orthopedic surgery.

The monthly bulletin of the New York Department of Health for June, 1924, contains an excellent article by Dr. Harris on the correction of the ordinary case of flatfoot. He points out in particular that one should not wear arch supports, especially in pointed shoes. An arch support is "a rather severe teacher." There is an immense amount of suffering caused by advertising foot specialists and shoe salesmen, the majority of whom know very little about the foot and especially about the human body

FIG. 42.—Bad position (left). Correct position (right). (*Courtesy Metropolitan Life Insurance Company.*)

itself, which must be depended upon to furnish the energy and nourishment to restore fallen arches and strained ligaments.

The correct position for standing is with the heels about 2 or 3 inches apart and the inner edge of the big toes not over 3 or 3½ inches apart so that the feet are nearly parallel, not "toes out." In standing at rest, keep the foot bearing the weight pointed straight to the front. To rest the feet while standing, turn them inward so that the weight is borne on the outer edge of each foot. In-toeing exercises strengthen the arches. A restful position also is to cross the feet and rest the weight on the outer edges of each foot while leaning the body against some support. Persons should walk noiselessly, not heels down first. The Indian's noiseless tread is correct. Hot and cold foot baths, about 5 minutes in length, strengthen the tone of the feet.

When walking or running, people should keep the toes pointed straight to the front, as an Indian does. Most people simply waddle along; that is, they walk with the feet turned outward and also stand that way. As we really make distance by swing-

ing our legs from their pivots at the hips and planting our feet upon the ground, that person covers the greatest distance with the same effort who takes advantage of the length of his foot to advance him and not the width of it. Furthermore, the one who walks splay footedly, or waddles, shortens his leg at its pivotal connection to the hip joint perhaps 4 to 5 inches, making necessary an extra drop and therefore lift of his body which, Dr. Harris says, is equivalent to raising the body 120 "step-inches" or 10 feet every minute, certainly a great waste of energy.

The correct shoe to wear is one made as follows: (1) straight inner edge to the sole, (2) narrow shank, (3) broad toe, and (4) broad heel, with heel coming well forward especially on the inner edge of the shoe. Don't allow shoe clerks to induce you into wearing ornamental shoes for anything but ornamental purposes. The stage shoe with its pointed toe and small size was never intended for everyday use.

Other Afflictions of the Muscles and Bones.—Let me repeat that pains "deep in the bones" and most noticeable at night, especially in the shin bones, and not accompanied by fever, are often due to syphilis rather than to "rheumatism." Such pains can invariably be checked by proper treatment of the syphilitic condition. "Aching in the bones" is characteristic of the onset of acute infections, *e.g.*, influenza, but real pain is absent. Inflammation may occur in a bone (osteomyelitis) or in a joint (septic arthritis) causing very great pain until it is operated upon and the pressure relieved.

A certain form of cancer (sarcoma) appears now and then in a bone, particularly in the leg, arm, or jaw, which is painless at first but soon causes a swelling, then softening, and finally absorption of the bone so that it breaks easily. A man so afflicted may break his arm, for instance, in lifting a pail of water. Such swellings are very serious and one is often correctly advised to have an amputation of the limb or jaw, as the case may be. There is no known method of absorbing a cancer of the bone.

Remember that the bones and muscles are built to take care of themselves if they are properly exercised and nourished, and diseases elsewhere in the body are prevented, as already described. It is most important to check and cure diseases of teeth, tonsils, etc. first, if one wishes to cure deformities and stiffnesses in the bones and muscles; also one must not resort to athletics or physical culture until all disease or infection anywhere in the body is cleared up.

Certain occupations or callings produce special deformities, some of which have been mentioned: "housemaid's knee," "beat elbow," "trench foot," "tango foot," "golfer's foot," "cane palm," "rider's bone" (in the thigh), "tennis-player's knee," also "tennis elbow," "chauffeur's knee," etc. With a great many of these deformities some disease or weakness, such as rheumatism, chronic infection of the teeth, tonsils, and ears, syphilis, gonorrhea, and tuberculosis, is present and is the main underlying cause, rather than the occupation.

The first-aid measures for bruised or broken bones, joints, tendons, or muscles where the skin is not broken through is (1) to press or gently squeeze the part for about 10 minutes to stop internal bleeding and swelling; then (2) apply with slight pressure cold cloths, ice bags, or pieces of ice wrapped in cloths for 10 to 15 minutes longer; then (3) take off the cold coverings and wrap up fairly tightly with a broad-enough bandage. A flannel bandage is best. The bandage should not be put on so tightly that the blood flow is stopped beyond the bandage. Sometimes it is well to tie a splint on the outside for support. Do not let the injured part hang down. Further than this one should not go, of himself, but get competent medical aid. I once treated a little 2-year old child's leg this way just after I had backed over it with a Ford touring car. The rear wheel went over just above the knee. No bones were broken fortunately, there was no shock, and the next day the child was as well as ever. Big bumps as on the head and elsewhere can be kept from swelling by applying a cold cloth, the side of a broad knife, or something flat like a watch or piece of metal, held tightly for several minutes.

All torn-open wounds should be immediately covered with a clean cloth—a clean handkerchief will do—and pressed down firmly enough to stop bleeding. Get to the doctor's office as soon as possible. Smaller wounds, nicks, scratches, etc., are to be taken care of as described on page 96.

THE VALUE OF PHYSICAL EDUCATION AND THE MEASURES TO OBTAIN EXERCISE

All youth emphasizes athletic prowess, the dance, and other forms of exercise apparently by natural instinct. The same has undoubtedly been more true, the further back in the history of civilization we go. In the age of adolescence, the response to the "inner call" reaches its maximum. Its culture by organized

effort, team work, competition, etc., is praiseworthy, teaches one control over his brute force, and increases quickness and accuracy of both mental and physical action. One learns to be a winner and to lose conceit in it, and more especially, to be a good loser.

The abrupt change from school life to the business world usually effects a great change in one's opportunities for exercise. Nevertheless, work itself should be a main if not *the* main source of exercise. Exercise is needed at practically all hours of the day, not the golf course, the diamond, gymnasium, etc., *after* hours only. The methods for getting this exercise must be thought out and acted upon.

The desk worker need not sit down continuously. Let him do part of his work at a high desk where he must stand. Let him "chase" some of his own errands from one office to another instead of grasping the telephone or pushing the call button. Let him take the elevator less often. He may keep records and files at a distance, some high up, some low down so that he is compelled to leave the desk and climb up or stoop down. Relaxation, usually with the lighting of a cigarette or pipe, is not exercise. Truly, the subordinate who is not permitted the privilege of having an office boy, etc. stands a much better chance for conserving his health through exercise than the oftentimes short-sighted executive in these matters.

The family man who takes care of his own household tinkering and repairs "has it all over" the misguided individual who hates to soil his hands and depends on the late afternoons, evenings, week ends, or vacations to harden or keep himself in trim. The former is nearest to the agriculturist group which has the lesser illnesses as a rule, and certainly the longer life.

The formal kinds of exercise suffice for the time, but are easily overdone and often add fatigue to fatigue already present from the day's work at a time when lounging or rest would be more in order. They should be thought of largely as extra efforts and as social affairs and perhaps opportunities for business contacts and, as such, most assuredly have their place where one has time, money, and the necessity of same, but as health-conserving forms of exercise they should be looked upon as secondary to the simple means just prescribed for *intermittent and continuous exercise during business hours.*

CHAPTER XI

NERVOUS AND MENTAL HEALTH

The nervous system is composed of the brain, the spinal cord, and the nerves. Twelve pairs of nerves, called "cranial nerves," come from the brain and go to the various parts of the head, such as the nose, eyes, ears, mouth, and throat, while one pair extends to the lungs, heart, stomach, and upper part of the bowels. Twenty-three pairs of nerves lead from the spinal cord and gradually subdivide like the branches of a tree until finally there is a little nerve twig to probably every stationary cell in the body. As stated in a former chapter, the nervous system originally came from a forerunner of the skin; thus every fixed or stationary cell in the body is still connected with the outside world, just as a single-celled animal has its covering to keep it in touch with what is going on around it.

Alongside the spinal column, mostly in front of it, is an accessory set of nerves with centers called "ganglia" which make up the sympathetic nervous system, which has control of involuntary muscles, vital organs, glands, and growth processes.

The human brain has been found to weigh from 31 to 65 ounces. In man it averages 49½ ounces; in woman, 44 ounces. It grows rapidly in the child up to the seventh year of age and then more slowly until one is 40 years of age, after which it begins to lose about 1 ounce in weight every 10 years. The size of the brain has no relation to one's mental faculties. Julius Caesar is said to have had a very small head and therefore a small brain. On the other hand, Daniel Webster had one of the largest brains ever recorded.

The brain itself is in two halves, a right and a left half, with a deep slit or crevice between them, but further inside, the halves are joined together. So far as can be seen, both halves look alike but we know that much of the left half governs the right half of the body (except part of the face) while much of the right half governs the left part of the body. For instance, a crushing blow just over the left ear may damage the brain or cause a hemorrhage

from bursting blood vessels, resulting in paralysis of the right side of the body.

In a general way the "mind" is located in the front part of the brain; the "centers" governing the movements and feeling sensations of the body, in the middle (surface) portion; while the eyes, ears, memory, "silent" areas, and "association" areas occupy the rest of it. The brain is said to "cerebrate" or have activity of some kind which goes on throughout life. A large part of this activity may be an unconscious or subconscious one, that is, beneath our notice. During sleep we are said to be unconscious. While awake we are said to be conscious or able to notice what is going on, although during much of the time our brains do more for us subconsciously than we ever give any thought to.

The spinal cord extends from the base of the brain only to about the level of the small of the back so that if one is injured below that level the cord is not injured. However, each pair of spinal nerves, as it leaves the spinal cord, points gradually more and more downward so that finally the lower ones travel straight down through the rest of the spinal column before reaching their openings to pass out to the lower part of the body and the legs. An injury to the brain may or may not produce paralysis, according to where it is, but an injury to the spinal cord almost always produces partial or complete paralysis. This paralysis begins at the level of the injury and usually includes all parts below it.

The spinal cord represents simply a continuation of the brain substance down the spinal column and has located in it collections of nerve cells which act like lower centers or substations in a telephone system. Thus as soon as we have learned any habit or movement so that we do not have to think about it any more, that habit or movement is taken care of by one of these substations in the spinal cord.

The purpose of the membranes of the brain, cord, and nerves may be summarized as follows: the coverings or meninges are three layers thick, the outer one (the dura mater) being stiff and nonelastic, like parchment paper; the middle one is thin and loose like a cobweb (the arachnoid); the inner one is very thin and glistening and is applied closely to the brain and cord surface, passing into all the clefts and depressions (the pia mater). These membranes protect the brain and cord from rubbing or knocking

against the skull or vertebral column, respectively, when we move or suffer violent injury; they also protect these vital structures against atmospheric pressure in case the bony compartment is fractured or opened. Finally, they support the blood vessels of the brain and cord, while the middle layer (the arachnoid) is filled with lymph (called "cerebro-spinal fluid," the same as is found within the cavities of the brain and the hollow central canal of the cord) which lymph acts as a fluid cushion as well as a nourishing liquid.

The purpose of the nerves is to carry impressions from the outside world to the cord and brain. These impressions are called "impulses" and act like electric waves traveling along a wire.

1. The sensory nerves, so called because they come from our nerve endings, such as those in the skin, called touch, heat, cold, etc., and from our special senses, the eyes, ears, nose, and various organs, protect us by letting our brains know what is going on, both favorable and unfavorable. The more these nerves are worked or used, the more practiced and experienced we become in any action, while at the same time the health and tone of the body is built up.

2. The so-called motor nerves, which look exactly like the sensory nerves and often travel in the same "trunk line" or nerve cord with them, carry impulses from the brain and spinal cord to the working parts, such as the muscles and secreting glands.

3. The sympathetic nerves are both sensory and motor and travel along with the other nerves as well as by themselves. They carry impulses to involuntary muscles and glands and vital organs; hence they are especially numerous in the heart, in blood-vessel walls, in the lungs, liver, and digestive tract, also in the genital organs, thyroid gland, etc.

4. In the brain and spinal cord are a lot of association or coordinating nerve fibers and bundles which crisscross and short-circuit nerve impulses. These appear to increase in number and size as we learn to do something or increase our knowledge and memory.

5. Other nerves located especially in the so-called "hind-brain," or little brain, appear to help the body in keeping its balance, poise, and equilibrium, and check or hold back overly strong impulses and movements which we may be inclined to make.

6. Certain nerves, probably belonging to the sympathetic group and called trophic nerves, govern the nutrition of the cells of the body so that each is regulated as to how much food and oxygen it takes up and waste material it gives off.

7. Finally, certain nerves, probably the same as several of those mentioned above, are so prominently short-circuiting between the sensory and motor nerves that we call them reflex nerves. These enable us to perform many actions without a thought to the matter and are principally for protection, such as winking the eye when something touches or threatens to touch the lid, or jerking away the foot when touched, even though we are asleep. We also educate these reflex paths so as to perform much of our work automatically.

Signs of Good Condition.—First let me say that I shall discuss the matter of the mind and our mental make-up from the point of view of health a little further on. At this place we are concerned with the nerves. We know that our sensory nerves are normal when our feelings of sensations of touch, heat, cold, pain, and pressure are normal. Our motor nerves are considered normal when we can move any part satisfactorily, when strength, endurance, and tone are there. The reflex nerves and nerve pathways are often used to estimate one's nervous system regarding its powers and failures. If certain reflexes are increased or decreased, or strange ones are present, we have pretty good indication of what is the matter. One of the commonest reflexes is that of the knee in which the physician taps you on the knee-joint while you are sitting down and have the knees crossed. A little kick follows, provided you are relaxed. The absence of this kick or "knee jerk" is characteristic of certain nervous diseases such as locomotor ataxia, while its increase—a more violent kick—points to pressure on the brain, but it takes more than just these signs to conclude that any disease is present. We call the nerves to the eyes, ears, taste, and smell "special sensory nerves" because these are highly specialized organs. We know when they are not working right by certain disturbance in them such as blindness, deafness, etc. A disturbance or disease in the trophic nerves is shown by a wasting away of that part of the body and sometimes a change into a fatty condition. Also the skin becomes smooth, glossy, and lifeless, and perhaps ulcers develop, while dropsy or swelling may take place. Furthermore, certain glands may start secreting excessively, while

others may dry up. When the trophic nerves to the glands of internal secretion are affected, such as to the thyroid gland, the ovaries, the testes, or pancreas, dire results may follow.

Habit Effects.—Whatever we do and continue to do soon becomes a habit. Therefore it is very necessary that in learning a task we learn the correct method from the start and not some wrong method. This is the real reason that we take a course of training in order to master any trade or calling. By this means we acquire skill and speed and also become able to do an immense amount of work with a great saving of energy. Whenever we can work more or less automatically, that is, so that we do not have to think about it, a habit is formed. Good habits save much energy—bad habits waste much.

Remarkable Powers of Healing in Nerves.—While injuries to the brain and spinal cord apparently heal to a considerable extent, this is usually due to the absorption of blood clots and swellings. If the nerve cells themselves are destroyed, they do not regrow. This is usually true of the chief cells in all of the vital organs. However, neighboring cells will enlarge and often succeed in taking their places. On the other hand, when nerve fibers or nerve trunks are cut in two they will regrow within a few weeks or months, depending upon their location and on keeping infection away and other tissues from getting into the way. Of course, during the time they are separated, loss of power to move the part (paralysis) is present where a motor nerve has been cut or loss of feeling (anesthesia) where a sensory nerve has been cut. For example, a deep cut across the forearm may paralyze the hand and also cause it to feel "dead," which means that both the motor and sensory nerves have been cut: yet healing and complete recovery will usually follow where a good surgeon has handled the case.

Signs of Strain.—The chief sign of strain in the nervous system is fatigue, which has already been discussed in the chapter on Muscles, Bones, and Joints. If fatigue is not soon relieved, persons become exhausted, very nervous, develop neurasthenia, and perhaps a true "nervous breakdown."

COMMON NERVOUS DISEASES

Neurasthenia.—The person with neurasthenia has no discoverable disease but complains much of headache, dyspepsia,

constipation, many pains, sexual weakness, talks much about his condition, and is difficult to cure.

Many things cause neurasthenia. The disease is especially associated with weakness in the sexual organs, sometimes the result of self-abuse. In such persons it is sometimes difficult to tell whether the nervous condition leads to the habit of self-abuse or whether the habit is the cause of the neurasthenia. Prolonged hard work with worry and loss of sleep may produce neurasthenia, particularly if there is a run-down condition or disease already present. Any form of poisoning, such as alcohol, tobacco, morphine, carbon monoxide, etc., may cause the affliction, and also germ diseases particularly after recovery from a severe or long-drawn-out infection of any kind. Coffee and tea given to children, and excess of these stimulants in adults, undoubtedly cause neurasthenia in many persons.

Long engagements between couples, unsatisfied sexual passions, as well as sexual excesses, are potent causes. Cabot, in his book on "What Men Live By," claims that neurasthenia can be overcome and perhaps permanently cured by regulating work, play, love, and worship, and as soon as a person makes up his mind to put all four of these on a sensible basis, his nervous weakness, no matter how it shows itself, may be entirely overcome.

Fatigue of the mind results in so-called "brain storm," "brain fag," or psychasthenia.

The commonest relief of brain and nerve fatigue is sleep. This has been discussed in previous chapters from the point of view of external influences. It is necessary to add here, however, that in order to enjoy sound sleep and therefore complete rest to the nervous system and also the mind, all surrounding disturbances should be cut off as much as possible. These include noise, light, cold drafts, overheated rooms, odors, gases, etc. While it is advisable to sleep in air as fresh as possible and also as cool as possible, direct drafts across the face and head or other parts of the body should be avoided because they disturb sleep. They also may easily lead to catching colds while one is asleep. Hence, a cold room rather than a drafty one is the best for sleep. Protecting the body so as to keep warm in cold weather is essential for sleep. This is best done by wearing a suit of underclothes with stockings or woolen bed slippers or a warm suit of pajamas. It is necessary to keep a person's own heat close about his body like an envelope rather than to heat up spaces between

the bed clothes. Too many bed clothes are objectionable because of the weight and because better results can be obtained by close-fitting night gowns with only light bed clothes on top. The Indian and the hunter commonly wraps himself only in his blanket and enjoys a warm sleep while breathing cool night air.

Other common diseases of the nervous system are neuralgia, neuritis, paralysis, meningitis, epilepsy, and locomotor ataxia.

Neuralgia is thought to be due to nerve starvation which in turn is usually due to pressure, poisoning, or infection. Neuralgia is usually only in a certain nerve, like facial neuralgia, intercostal or chest neuralgia, and sciatica. The pain comes and goes, with intervals of relief, and is sharp and shooting. Each onset is sudden and it ends the same way. The skin over the area is usually sensitive to the touch and to a draft of air. The cause must be discovered in order to get much relief. The nerve pressures, when present, usually do not occur along the spine, so that spinal adjustments give no permanent relief. The treatment often requires a nerve specialist to assist the general physician. The victim must return to a simple diet (see p. 57) and a simple life.

Neuritis, or inflammation of a nerve, has already been discussed to some extent in the previous chapter. Sometimes many nerves are involved, as in polyneuritis or multiple neuritis. It is very painful when sensory nerves are the ones inflamed, but may be without pain when motor nerves are involved. In this latter instance, local paralysis and wasting of muscles and tissues may occur. Among the commoner poisons producing neuritis are lead, arsenic, alcohol, carbon bisulphide, and mercury. Lead poisoning usually affects the nerves to the bowels, causing lead colic, and the nerves to the arms causing, at first, weakness in the grip and then "wrist-drop," that is, the inability to raise one's hands backward on the wrist. There is no pain connected with wrist-drop, but gradual wasting of the muscles of the hands and arms usually occurs. It usually recovers of itself within a few weeks' to a few months' time, provided one stays away from the exposure to lead. It is also hastened in recovery by certain drugs, massaging, and electrical treatments. Neuritis due to arsenic occurs when small amounts are taken or inhaled each day. Otherwise death from arsenic poisoning usually occurs before neuritis appears. Arsenic neuritis usually occurs in the legs and causes "foot-drop," that is, the inability to raise the feet while

walking so that one tends to stumble over his toes. Quite complete recovery from this takes place when the exposure to arsenic is stopped and careful treatments are instituted.

Paralysis has been discussed enough, perhaps, for our purposes in previous paragraphs. When occurring in the brain, it is called a "stroke," and is nearly always due to a hemorrhage or the formation of a blood clot deep within the substance of the brain, too deep for surgical operation. When paralysis occurs in a certain nerve or group of nerves, it may come on at first as neuritis. Much of it is due to colds, injuries, poisons, alcoholism, mastoid and middle-ear disease, acute fevers, pneumonia, meningitis, diphtheria, and syphilis. Sometimes the growth of a tumor is the cause, or a chronic disease like diabetes or Brights' disease is present. The prevention or early treatment of these diseases is necessary to prevent paralysis.

Meningitis may be epidemic and seems to be caught through the nose like an ordinary cold. If often occurs also in the course of tuberculosis, typhoid fever, and pneumonia. It is a frequent cause of death from skull fractures and from "gatherings" in the ear. It is necessary to prevent the cause in order to do much with meningitis, but a protective serum has been discovered for the epidemic form.

Epilepsy is usually hereditary, but it may not show up until one is 12, 15, or even 25 years of age. It is especially common among the children of alcoholic parents and is thought to be due especially to drunkenness on the part of father or mother at the time of conception. It occurs also in families where insanity exists. Epilepsy may show only as sleepwalking, or even as momentary spells of loss of consciousness which are unknown to the person himself. Usually, however, fits or convulsions with frothing at the mouth and biting of the tongue occur. The epileptic person usually has no warning when his fit or spell is coming on; therefore he is absolutely unsafe outside of a special sanitarium or colony where such persons are kept. He may, however, be able to make a living, and the remarkable thing is that oftentimes he is very brilliant mentally. Epilepsy is one of the diseases which borders on genius. Julius Caesar and Napoleon Bonaparte were said to be epileptics. There is as yet no positive cure known for epilepsy, but much can be done to prevent the spells or fits by keeping up the courage and morâle as well as by correcting all physical defects such as those of the

eyes, teeth, tonsils, sinuses, appendix, etc. By attention to these defects and any diseases present, the fits may be made to disappear for long intervals at a time. During a fit, a piece of rubber or cork should be placed between the teeth. It is foolish for epileptics to spend money on advertised cures, because there are none. Nearly all alleged cures contain bromides or chloral which tend to quiet one's nerves and which can be obtained on a physician's prescription at very much less than the exorbitant prices usually asked by the advertiser. Many of the advertised remedies contain no drugs which are recognized by the medical profession as having any influence in epilepsy at all.

Locomotor ataxia has been mentioned as a disease due to syphilis acquired usually from 5 to 25 years previously. Those who have had a light case of syphilis are most apt to have locomotor ataxia later on. Therefore every case of syphilis should be so thoroughly treated in the first year or so that one is quite completely cured. This is now able to be done by making Wassermann (or similar) tests of the blood, and perhaps of the spinal fluid. It is probable that the disease is only arrested and that blood tests should continue to be made every 3 to 5 years for the rest of one's life. It is possible to do a great deal for locomotor ataxia, sometimes stopping the progress of the disease entirely, after which a person can take training for reeducating his muscles and movements. Fortunately, the person who has locomotor ataxia or "tabes" suffers no pain, but because he loses control over his bowels and bladder, he must take great care of them to ward off germ infections, especially of the bladder and kidneys.

Headache is a symptom, not a disease. It is always abnormal. Like pain, it is one of Nature's definite warnings that something is wrong and ought to be corrected.

Headache has very many causes. Without doubt the commonest cause is eyestrain due to imperfect eyesight. Therefore one who has headache off and on should have his eyes examined by an oculist. This is always the first procedure. Bad teeth, diseased tonsils, nose trouble, sinus disease, ear trouble, and mastoid disease are other common causes. Next in order comes indigestion associated with constipation. This form is often migraine headache. Ice-cold drinks as on a hot day may cause a violent headache. Persons should never drink water which is under 50°F. in temperature on a hot day. In fact, headache

when very warm is a warning sign of a collapse, sunstroke, or heatstroke, so that one should fan himself and remove part of his clothing at once. Poisonings of many kinds cause headache. Prominent among these are the breathing of gas fumes, carbon monoxide from poorly ventilated quarters of all kinds, lead poisoning, benzine and benzol poisoning, etc. High blood pressure, kidney disease, anemia, heart disease, malaria, and most fevers have headache as a common symptom. Syphilis causes a headache which is much worse at night. Nervous and hysterical persons have headaches which are usually worse at the top of the head. The fallen womb and other pelvic diseases in women produces a headache at the back of the head and neck. Facial neuralgia often has headache with it. Fatigue is a common cause and probably explains why headache is so common a symptom in neurasthenia. Occasionally a tumor of the brain is the cause, but the oculist can nearly always diagnose this by examining the eyes. The bilious headache is one which is usually relieved by vomiting; yet indigestion is not the cause most of the time.

Migraine is one of the worst forms of headache. It is often hereditary and occurs among other members of the family. It comes at certain periods, as every week, every 2 weeks, every month, etc., and one can usually tell in advance when it is coming It is usually one sided and one may see colored lights, balls of fire, etc., while sight is blurred in one eye. The pupil on the affected side dilates and contracts, and that side of the face may be hot and the blood vessels distended. The headache starts in one spot in the temple, forehead, eye, or neck. It gradually spreads and gets very violent. Dizziness follows with nausea and vomiting, which often relieves the headache. The attack lasts from 1 to 3 days or more. It recurs for years. Migraine usually begins in childhood. It rarely lasts after one is 45 to 50 years old. Undoubtedly fatigue is the exciting cause each time it occurs, and instead of dieting, persons should keep themselves well nourished. Simple, natural forms of foods should be used. Starvation makes the condition worse. Eyestrain is the commonest cause of the fatigue. All physical defects should be corrected. Migraine seldom occurs in those who work in the open air, particularly where vigorous exercise is practiced.

Since headache is only a symptom, persons should go no further in drugging themselves than taking aspirin, bromides, and perhaps baking soda, and these for temporary relief only. Some-

one has said that however else a headache may be treated, it should not be treated with contempt. It is one of Nature's most prominent signals, and, if it recurs from time to time, calls for a complete overhauling. The cause must be discovered. Oftentimes, too rich a diet and especially the occasional overindulgences in sugar or candy is the exciting cause. Too often, it is a sign of increasing blood pressure with Bright's disease (nephritis) in the background and, eventually, uremia in the foreground.

THE HEALTH OF THE MIND

The chief function of the brain is the mind. Just what the mind is, is only partially known even to the best informed. Those who are skilled in the normal traits of the mind, that is, its behavior when acting as it should, are called "psychologists." Those who are skilled in its diseases are called "psychiatrists." The latter are always medical specialists, since one skilled in mental diseases must first be skilled in body diseases. There are no such gifted beings as "mind readers," nor for that matter fortune tellers, soothsayers, mediums, and others who claim to be able to read one's mind, to tell the future, and to communicate with spirits. Of course, some persons are pretty shrewd and, just as the magician on the stage fools us with his tricks, they may delude one into believing they have supernatural powers.

"The mind is a way of behaving in promoting self-expression and the individual is (considered to be) a bundle of impulses seeking expression in various ways." The characteristics of one's mind, called "faculties" or "mental faculties" are: consciousness, perception (or the ability to perceive what is going on by means of the various senses), attention, train or flow of thought, memory, imagination, emotions, will power, and judgment or reason. Judgment is supposed to be based on a correct working of all of the others. Judgment may be looked upon as at the top of a pyramid composed of all of the rest. Should judgment or reason not be at the top at any time, one's imagination or emotions, etc., may "take possession of him." When this is true, such a person is considered hysterical, feeble-minded or perhaps insane because he cannot fit himself to his surroundings and act in a sensible way. Any of these "faculties" which characterize the behavior of the mind may be controlled and developed until it comes to have more or less possession of

our judgment or reason. From this it can be seen how necessary it is to encourage development of certain ones of the faculties, such as the memory, imagination, attention, and will power, while keeping certain others, such as the emotions, under control so far as they affect our actions or behavior. The modern idea of schooling is simply "to provide the child with occasions where impulses may be stimulated, self-expression promoted, and intelligent behavior made possible, encouraged, and

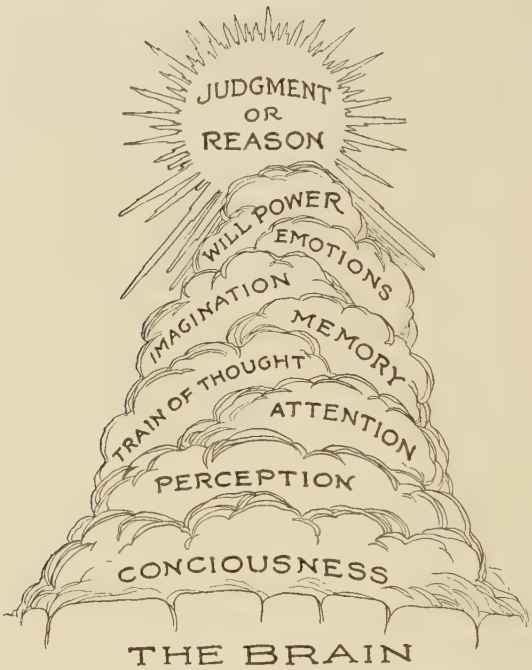


FIG. 43.—The mind may be likened to a pyramid whose base is in the brain and whose apex is in "judgment or reason."

demanded."[1] In short, the child should have the best tendencies in him drawn out and educated or developed in order to make him the best citizen, instead of being drilled in things which he does not have the natural impulse to follow or in which he is "poor." On this basis a naturally bright pupil should be sent through high school and perhaps college, if the money can be found, but the mediocre one who tends to put everything else before his studies is only wasting his time and money to be made a loafer while he

[1] PROF. ORVILLE G. BRIM, *Texas Educational Survey*, vol. 5, p. 247, 1924.

might be profitably employed at some trade or calling. Look out for the "blind-alley" job in which the boy, for a dollar or two more per week, learns nothing and ends up as a common laborer. Likewise, the adult should always be encouraged to do that which he is best fitted to do, and not hindered or put at something else. These are the best rules for the health of mind and personal efficiency from the standpoint of behavior, willingness, and enthusiasm.

The commoner diseases of the mind, called "psychoses," are hysteria, feeblemindedness, delirium, thyroid or goiter disease, paralysis of the insane (dementia paralytica), old age or senile dementia, melancholia, or sadness, paranoia or the disease of the dangerous "crank," and dementia praecox or weakening of the mind.

Hysteria is a condition in which the emotions get the upper hand of judgment and even overcome the will power. It is most prevalent in children and young and older women, but is not uncommon in men. It may also be a sign of insanity or an unstable nervous system or bad heredity but usually is due to false early education in which the child has been allowed to have its own way; also to bad nourishment coupled with worry or excitement, or some severe shock. When coming only in spells, it usually passes off without bad results. When present more or less all the time, it is oftentimes based on a desire for sympathy and may be carried on to foolish extremes, such as mutilating oneself, imitating paralysis, etc. It, of course, renders persons unable to do much or good work. Hysterical persons, however, never seriously hurt themselves or anyone else unless by pure accident. They need a careful examination and supervision by a physician trained in the field of nervous diseases. They can usually be cured in time.

Feeblemindedness or weakmindedness is hereditary, almost always. It seems to be passed on from parents to children just the same as blue eyes or light hair. Sometimes it may be due to an accident in childhood or to the mother before the child's birth, or to meningitis and acute fevers. It is not due to the intermarriage of near relatives. If such relatives are normal, their children will be normal; but if one or both are feebleminded, as is apt to be the case when near relatives marry, their children may be feebleminded according to a well-known law of tendency called the "Mendelian law of heredity."

The feebleminded person is one whose mental development stops at some age during childhood and, while his body continues to mature, his mind does not. Those with minds only 2 years old are called "idiots," those with minds 4 years old, "imbeciles," those not over 12 years old, "morons" or fools, and those not over 14 or 15, "irresponsibles." The fools and irresponsibles make up a large part of the people whom we know as ne'er-do-wells, criminals, hoboes, degenerates, prostitutes, paupers, alcoholics, drug fiends, spendthrifts, loafers, niggards, cranks,

FIG. 44.—A common form of feeblemindedness takes on the aspect of begging. (*Permission granted by Herman N. Bundesen, M.D., Chicago Commissioner of Health.*)

visionaries, malicious gossips, fops, sissies, ninnies, and "empty people" in general. We must distinguish, however, between persons who are uneducated and those who are mentally deficient, feebleminded, or of a low level of intelligence. Theoretically, an uneducated person is just as intelligent as an educated one since intelligence is born in us, while education or knowledge is wholly acquired. Feeblemindedness is, of course, very common; in fact, only a few persons are real geniuses and outstanding leaders, perhaps not over 10 per cent. However, most of the morons are capable of training enough to make a living and

usually make good citizens, but they have to be continually bossed or supervised.

Intelligence can be determined by psychological tests which have now been perfected to a high degree when applied to the individual and to a fairly high degree when applied to groups of persons. By these tests one can be told in advance whether he has the natural native-born intelligence to take up some line of work or not. By this means, in an hour's time a person can be advised or his intelligence found out, where it might ordinarily take months or years to determine that he is not fitted for a certain trade or job. He might, on the other hand, be very successful in something else. Many people are today doing work which is beneath their intelligence and ability, while many others are holding responsible positions who have not the "brains" for it. It can be seen that this is a serious menace in a democracy where each one's vote is as good as another's, because questions are apt to be settled simply by majority vote and not according to intelligence. Intelligence has little relation to persistence or "stick-to-it-iveness" which depends upon one's physical abilities rather than his wits. Hence the man short on "brains" is just as likely to be "continually at it" as the man with "brains." The latter sticks to it only, however, when he knows that he cannot accomplish his purpose except by persistency. On the other hand, the really intelligent person is oftentimes lazy or a "quitter" and hence does not advance himself in life nor lead others.

The question of feeblemindedness is not hopeless at all; for, by training, the dullard can be made more and more valuable; but it is a question of whether it is worth while, as Dr. Goddard says. For instance, it might take 40 years to "drill in" what a 14-year-old child would already know.[1] But feeblemindedness is considered best handled by patient education and training.

Legislation restricting marriage of the feebleminded, confining of the worst cases, and sterilization, which can now be done in both sexes by the X-ray alone, are measures which are certain to grow as civilization goes on. It is possible also that the right to vote may some day be based on one's intelligence, with the ability to read and write as the starting point.

[1] Read "Human Efficiency and Levels of Intelligence," by H. H. Goddard, Princeton University Press, 128 pp., 1920; also, "Feeblemindedness," by the same author, The Macmillan Company, 1915.

Delirium is usually a temporary affliction of the mind due to fevers, toxins, exhaustion, and perhaps insanity. Certain poisons like lead, alcohol, mercury, carbon bisulphide and many others often produce a "fevered brain" or delirium.

Thyroid disease or goiter sometimes shows mental symptoms, usually where extreme nervous symptoms are also present.

Paralysis of the insane (dementia paralytica) is due to syphilis of the brain in which the person, in midlife or later, as a rule, shows changes in his personality usually about opposite to his former behavior, goes "crazy on religion" or "perpetual motion," and finally has paralytic strokes. This condition, like locomotor ataxia, comes on usually from 5 to 25 years after an infection with syphilis which was not properly and thoroughly treated. Modern

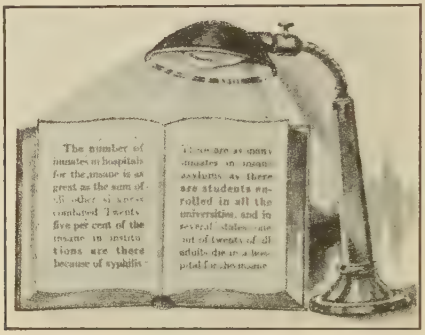


FIG. 45.—This book has fine print but its message should be known to all. (*Permission granted by Herman N. Bundesen, M.D., Chicago Commissioner of Health.*)

medical science is gradually getting control of dementia paralytica, and a number of cures have already been announced.

Senile dementia, or insanity due to old age and hardened arteries, is quite common. Such old persons are almost irresponsible and many of them have to be confined. They are cross, irritable, full of foolish notions, and often dangerous to themselves and others. It is too bad that sometimes our brains begin to die before our bodies, and as a result our old people have to be put into asylums, but it is true nevertheless.

Melancholia or constant sadness is a disease coming on usually between 40 and 60 years of age, most prevalent in women and associated with the change in life, and with a history of nervous diseases in parents in 84 per cent of cases, according to Dr. Albert M. Barnes. It is apparently more common in women

who have been mothers, but it is also seen in men. Such persons have very moody spells, refuse to work, are very sad, can't see any bright side to anything, refuse to listen to reason, believe that all sorts of terrible things are about to happen, oftentimes that parts of their bodies have turned to stone, or that some animal, such as a frog or snake, is inside of them, and so on. In this condition of mind they are very apt to try to commit suicide and occasionally other acts of violence; consequently, they have to be

FIG. 46.—Criminals, as a rule, cannot be distinguished in appearance from the usual citizens. (*Donald A. Laird in Hygeia.*)

watched. If nothing happens, most of them recover after several years' time, particularly if the condition comes on late in life.

Paranoiacs or dangerous cranks are persons who are particularly "crazy" on one thing; usually they are "off" in regard to someone whom they imagine is persecuting them. Men are more often afflicted. They think they hear or see this person plotting against them. Thus the paranoiac imagines the President or the Governor or some certain person is trying to wreck his life, steal

his wife, destroy his brains with electricity, etc. He can reason clearly and is clever in argument and very boastful about his delusion. On other things he usually appears perfectly normal. The condition is hereditary; the person often appears abnormal in childhood, but the cause is entirely unknown. Such persons are very apt to get a gun and kill the person whom they consider their enemy.

Dementia praecox or weakening of the mind, is a very common form of insanity, coming on usually between 15 and 35 years of age. It resembles the insanity of old age and apparently is due to a beginning decline of the brain or mind early in life. In nearly 54 per cent of cases a hereditary taint is found. There are several forms of the disease in which great dulness or excitement, and cycles of one and the other, may be present. The victim tends to withdraw into himself, to avoid contacts with the world about him, and to give himself up to daydreams. He will not talk about his thoughts. He has no emotions but keeps repeating silly and impulsive acts. Usually he is not harmful, but one can see that he is more or less demented and unable to take his normal place in life, though sometimes capable of doing routine work under direction but on a lower level than formerly. This group is said to make up 40 per cent of the inmates of insane asylums! They keep accumulating and yet live a long time.

The cause of this mental disease is unknown. Some think it is due to faulty action of the glands of internal secretion, especially the thyroid and sexual glands. Some think that faulty mental habits learned in childhood are the reason. At all odds children should not be allowed to get into the habit of staying by themselves, sitting about and daydreaming, but should be made to play about with other children, encouraged to make things, to take disappointments cheerfully, and to tell parents freely their troubles. Whenever a child confides a trouble to a parent, it should never be punished but helped out of the difficulty and advised about similar mistakes. Drunken parents are often found in looking into the past histories of those suffering with weakness of the mind. Such victims should be especially advised against worries, encouraged to increase their will power, to change their thoughts to things which are cheerful or amount to something, to have chums in whom they can confide, to overlook fancied slights on the parts of others, and especially to correct all faulty habits of personal hygiene, diet, alcoholic drinks, and to

have any physical defects of the eyes, teeth, tonsils, feet, etc., corrected.

Persons threatened with weakness of the mind should not marry; if married they should not become parents, because the children will very likely be feebleminded, epileptic, or insane. Direct inheritance can be traced in from 50 to 57 per cent of all cases of insanity.

The Power of Mind over Body.—Our bodies are, of course, subject to our minds, but the health of our minds is closely

FIG. 47.—A backyard hobby such as this may be used for the "defeat of tired nerves." (*W. A. Bloedorn in Hygeia.*)

associated with the health of our bodies. One cannot produce a disease by thinking of it nor can he cure a real disease by thinking of it. He may, of course, curb an unruly mental faculty such as passion or uncontrolled emotions by an assertion of his will power. The force of mind can also cause many subjective symptoms, such as pain, headache, etc., to disappear, provided they are imaginary in the first place, but the control is limited where such symptoms are really due to physical causes like injury or disease. Some people fool themselves into thinking they have cured a disease of the body by making up the mind that the disease does not exist, but this is accounted for by

the fact that a great many, if not most, diseases of the body are self-limited and get well of themselves. This of course offers a great chance for mental healers, witchcraft, patent medicines, and quackery to "make good" in the eyes of the ignorant. The author's grandparents told him of the "cholera dances" which the people used to hold near Dayton, Ohio, in the great epidemic of Asiatic cholera in 1833 under the impression that gaiety of spirit would keep the disease away, but it was soon found that outbreaks followed the dances. While there are only a few specific drugs for curing diseases, there are a considerable number of drugs which will relieve or cure symptoms. On the other hands there are many important methods and conditions which turn the tide in battling a disease. Nature herself cures the disease. Man has discovered many of the things which govern the final outcome. Drugs and other methods of cure of diseases—both mental and physical diseases—are not man's inventions but, where they amount to anything at all, are man's discoveries from the great storehouse of Nature's secrets.

Rules for self-control are many. The following appeal to the author:

1. Make your emotions subject to facts. Remember that far more of our actions are due to our emotions than to facts and try to correct this tendency.

2. Avoid hasty actions; take or demand time to think and for shaping up your plan of action to meet the circumstances.

3. For immediate relief, whistle or shrug your shoulders and do something you like to do, and dismiss your troubles.

4. Investigate, weigh, and judge the facts in the case. Remember motives conflict, but facts do not.

5. Never give blind passion the bulge on prudence and forethought.

6. Keep all of your faculties (see p. 201) subject to your will.

7. Plan your work; then work your plan.

8. Plan more work than before: by no means relax or loaf when you are out of self-control.

9. Be thrifty; don't dissipate when you are out of sorts. To do so greatly weakens your will power and therefore your self-control.

10. Get the habit of working. It is just as easy to get this habit as the habit of putting it off or loafing.

11. Self-control means action at the proper time as well as control. What you should do, do without delay; this Chinese

proverb reads literally, "Wait until the Yellow River runs clear and how old will you be?" The modern version is "Motivate yourself."

12. Can you stand prosperity? Many people lose self-control when good fortune comes. While some truly dissipate, many become actually less efficient and dependable than before. Discipline often demands that he who has been advanced be set back. There was an unwritten law where the author once worked: "When a man thinks you can't get along without him, fire him."

CHAPTER XII

THE EYES

It is generally accepted that the eyes are defective in 50 per cent of adult persons, so far as accurate vision or freedom from permanent trouble is concerned. To civilized man who must use his eyes so much in his work, this is a great handicap. Fortunately most of it can be corrected by wearing glasses.

The simple test for eye trouble is the ability to read something near at hand and to see something accurately which is at least 30 feet or more away; also, whether the eyes feel inflamed or painful and whether they appear abnormal.

There are many afflictions of the eyes, eyelids, and vision—or ability to see. The commoner diseases of the eyelids are inflam-

Fig. 48.—Snellen eye test letters. The figures refer to the number of feet away the different-sized letters should be plainly seen. (*From May, "Diseases of the Eye," W. B. Saunders Company.*)

mation of the edge of the lids (blepharitis), wild hairs, and styes. Eyestrain is a common cause of all these conditions, but various skin diseases, acute fevers, poor nutrition, and outside influences, such as dust and gases, may be to blame. When these diseases persist or repeat themselves, one should always seek the aid of a physician or an oculist, but not an optician or optometrist, since these are not qualified by training to treat eye diseases or afflictions, however well they may be trained to "fit glasses."

An inflamed tear sac (in the corner of the eye next to the nose) may be the result of a cold, an injury, or some disease in the nose. Also it is common in persons who are "run down" from various causes. It is sometimes due to dusts and smoke. Self-treatment is not recommended.

Pink eye is a minor contagious disease which all persons usually have once or so and which lasts only a few days. During this time one should stay in a darkened room. Otherwise, astigmatism and other disturbances in vision may result and be permanent. Boric acid eyedrops may be used.

Red eye is very common and usually due to strain from reading or working hard in poor light or overly bright light. It is also caused by vapors, fumes, and smoke. It is also seen in a drunken person, or in persons having colds, and may result from severe coughing. It is common in smokers and particularly those who sit in rooms filled with smoke or who smoke sitting down so that the fumes accumulate around the face. Red eye is often pro-

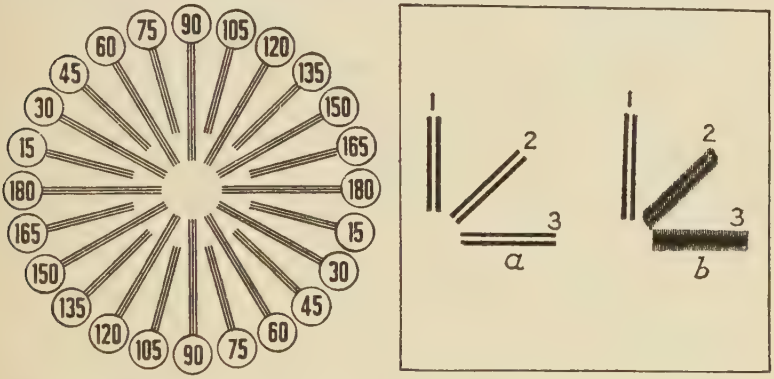


FIG. 49.—Wallace's chart for showing astigmatism. All the spokes of the wheel should look clear as shown in *a*. If one has astigmatism certain of the spokes will look hazy as shown in *b*. (*From Jackson, W. B. Saunders Company.*)

duced by face powders and powder puffs. Certain diseases like granulated eyelids may show it. The condition is to be taken as a warning sign and the cause prevented if known.

Granulated eyelids (**trachoma**) is a slow-going but contagious disease of the upper eyelids on their under side, the side next to the eyeball. Usually nothing can be seen from the outside except that the person squints his eyes and also avoids daylight or bright light as much as possible. In bad cases the inside of the lower eyelids is also inflamed with the granules, which look like jelly drops or tapioca pudding. The disease is common among immigrants, and for this reason the eyes of all immigrants are carefully examined by the medical officers of the Public Health Service before they are admitted to the country. It also exists particularly among foreigners in factory towns and in recent

years has been discovered to be very prevalent among native-born inhabitants of the Alleghany Mountains, in the Virginias, Kentucky, Tennessee, etc. It has also appeared among the Indians in the West. The disease is serious because, after years, it results in blindness and in the meantime keeps persons from working for periods at a time. It goes in spells. Any dust particles, cinders, or other foreign matter lodging in the eye usually stir the condition up, resulting in a rather severe sore eye for a couple of weeks, which then subsides perhaps for months or more. The disease is thought to be spread by adults to children within

FIG. 50.—These men were two of a large group of steel workers who were found to be suffering from "trachoma" or granulated eyelids. (*Courtesy Youngstown Sheet and Tube Company.*)

the family, principally by towels, washrags, washbasins, etc., which allow secretions of one person's eyes to be spread to another's. It is principally because of this disease and the one next to be described that our health officials have passed laws or regulations prohibiting the use of roller towels or other towels used by more than one person before being laundered. Fortunately, granulated eyelids can now be cured by a simple operation under a local anesthetic, although a general anesthetic is better, the whole operation usually requiring not over 2 or 3 minutes for both eyes, after which the person is usually able to go home at once and to use his eyes within a day or so. The

United States Public Health Service and certain health departments have organized clinics to cure this disease.

Gonorrheal inflammation of the eyes is a very severe disease due to getting pus into the eyes, usually from the fingers, where a person suffers from "clap" or gonorrhea (see p. 148). It may also occur in the eyes of newborn babies because of gonorrhea in the mother at the time of birth. It may also be gotten from common towels and washrags, particularly when still damp from use by a diseased person. The eyes, in a few hours, become reddened, begin to discharge, and are very painful. They should be taken care of at once because the disease tends to "eat out" the pupil and white portion of the eye, resulting in permanent blindness, all within a few days' time. While the individual is waiting for medical aid or if he is where he cannot get it promptly, the sore eye should be covered with a cold pack or with ice wrapped in pieces of cloth. This will delay the severity of the inflammation. That in newborn babies (ophthalmia neonatorum) is invariably prevented by the so-called Credé method, which consists in dropping one drop of 1 per cent silver nitrate into each eye of the baby within the first few minutes after birth. After a moment or so a few drops of boric acid solution is dropped in to remove the excess of silver nitrate. Some physicians use 20 per cent argyrol but this is not considered reliable nor recognized as the proper procedure, as a rule, in health regulations. Since newborn babies get sore eyes from other causes than gonorrhea—in fact, statistics show that in 6 cases out of 10 sore eyes are not due to gonorrhea, but to other things—the laws of many states require that all babies at birth be given the Credé treatment or similar treatment to prevent blindness. I believe the Credé eye treatment should be given to all newborn babies "rich or poor, black or white," as it causes no harm but greatly strengthens the eyes for their newly acquired duties and their battles against germs.

Inflammation of the eyes is very often due to germs. A great variety of germs may cause it. Oftentimes, as in "pinkeye," the inflammation is contagious. A sensation of sand in the eyes, reddening, smarting, itching, and burning may occur and it is painful to look at the light. Warm boric acid may be dropped into the eyes for relief, but a physician should be seen. Inflammation may result in ulcers and lead to blindness; or it may result in chronic conjunctivitis with pus or "wax" accumulations, a feeling as though something were constantly in the eyes;

the eyes get tired quickly and one avoids the light as much as possible.

Pterygium.—Another common affliction seen in the eyes of persons who are much exposed to the weather or to dust, mortar, lime, smoke, etc. is pterygium, a triangular-shaped flat growth extending from the corner of the eye toward the pupil. Many old persons also have it. This growth is not serious but should be removed if it extends over the pupil, because it then interferes with vision.

Ulcers of the eyes are usually due to getting foreign bodies like dust, cinders, or particles of steel in them, followed by an acute infection which destroys the top layer of tissue, leading to an ulcer. Where the ulcer comes over the pupil, it destroys the smooth gloss-like surface after which scar tissue forms producing partial or complete blindness. Ulcers may also be due to a general run-down condition, especially in children and youths up to 20 years of age who are not fed properly or who have a tendency toward tuberculosis. Ulcers often follow acute disease, such as smallpox, measles, and scarlet fever. Because of the danger of causing ulcers all foreign bodies and slight injuries to the eyes should be taken care of very promptly by a physician or by a nurse under a physician's supervision. Many workers lose their eyesight by allowing a fellow worker to take a cinder or piece of steel out of the eye with his dirty fingers while using a match or knife point or dirty handkerchief. When something gets into the eyes, tears usually come and float it out, usually toward one corner. This can be aided by pulling the upper eyelid outward by taking hold of the lashes. If the offending particle does not float out, the lower lid should first be pulled down to see if it is present there. If found, a clean edge or corner of a handkerchief may be touched to it and thus remove it. In no case should the handkerchief be twisted into a point unless the hands have just been washed and dried to remove dirt and germs as much as

FIG. 51.—Method of drawing the upper lid back for removing a cinder or other foreign body from the eye. (*Courtesy Metropolitan Life Insurance Company.*)

possible from them. Especially the handkerchief should not be touched to the mouth or lips. If the cinder or other foreign body is not found on the lower lid, the upper lid should be carefully turned inside out by pressing a long match-stem or narrow pencil against the top of it, or by using the thumb and finger of one hand while the eyelashes of the lid are grasped with the thumb and forefinger of the other hand so as to pull the lid down and forward; then it should be turned upward over the match or finger so as to show the inside of the lid. The foreign body can then be removed, as a rule, with the clean handkerchief as above stated. Where the particle is stuck or driven into the tissue, let it alone until a physician can be seen. In the meantime, boric acid may be dropped into the eye and a cold cloth or ice bag placed over the eye.

Burns of the eye are usually due to lime, acid drops, or ammonia. Any particles or lumps of lime should be removed quickly and the eye rinsed with clear water at once. Milk is better still; Dr. Pyle recommends a drop of strong sugar solution followed by a teaspoonful of sweet oil. Immediately afterward the physician should be seen. Acid burns may be treated by flushing the eye with soda water, made by dissolving a teaspoon of baking soda in a tumbler of warm water.

Cross-eyes should be promptly treated in babies and corrected during childhood. Otherwise one eye usually becomes practically useless.

Cataract comes as a gradual blurring of the eyesight which takes place slowly and results in blindness, unless the lens of the eye is treated or removed. Cataract coming on in young persons is usually due to syphilis or bad nutrition. Cataract is usually the result of old age, but it occurs in workers, such as glassworkers, puddlers, and furnacemen, whose eyes are subjected to the glare of hot furnaces. The operation for cataract and the restoring of vision is usually very successful.

Inflammation of the pupil (**iritis**) results from colds and injuries or foreign bodies which lodge in the inside of the eyeball; but, more often, in persons who have rheumatism, syphilis, and sometimes gonorrhea. Other acute diseases may cause it. It may be due to any injury to the other eye, especially if a foreign body is left in the other eye. It may occur weeks, months, or years in a good eye after a puncture or injury of the other eye. Hence, it may lead to blindness unless promptly treated. The bad eye

feels sore again, but soon the good eye begins to feel tender, cannot stand much light, and sheds tears, and the sight in it grows dim; the white of the eye may show red, especially around the pupil area. Always seek prompt treatment for sore or weak eyes. *Do not let a useless eyeball remain* when the doctor or oculist advises you to have it removed.

Eyestrain means fatigue of the eyes but it may cause many symptoms elsewhere such as headache, migraine, and dyspepsia. Dr. Pyle, in his textbook on "Personal Hygiene,"[1] states that it is caused by nearsightedness, farsightedness, astigmatism, general overwork, or a poorly nourished condition. It may be the first sign of a goiter. It is certain to come on after midlife in persons who use the eyes for close work unless they wear glasses. It is a common result of working in poor light. It may follow an

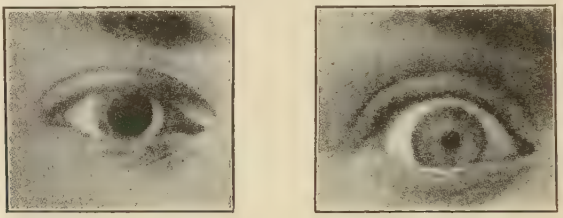


FIG. 52.—Pupil of eye dilated (left) to let in plenty of light when illumination is dim. Same pupil (right) contracted to shut out excessive light. Both conditions may mean eye strain and are a common source of fatigue. (*Illuminating Engineering Society of America.*)

inflammation of the eye or a small ulcer. A short spell of sickness; close eye work during menstruation in girls; facing bright parts of machinery, desks, and buildings, causing glare—all are common causes of eyestrain.

The symptoms of eyestrain are a continual sense of discomfort in the eyes, which may become very painful. In reading, the type or letters may blur or run together; there may be twitching of the eyelids and, in bad cases, great difficulty in keeping the eyes open on account of drowsiness. The eyes may smart, itch, or burn, and continually "water," or they may appear red, even including the edges of the lids, while styes often occur and are relieved only by the use of proper glasses. There may be great desire to avoid the light.

In addition to these eye symptoms the person invariably suffers from headache, particularly "sick headache" and headache made

[1] W. B. Saunders and Company, 7th ed., p. 212, 1920.

worse by reading, sewing, riding in the cars, attending the theatre, etc. Constipation and indigestion often accompany eyestrain, as well as dizziness, nervousness, sleeplessness, and even St. Vitus' dance, while epileptic attacks are likely to occur in those so disposed. General debility or run-down conditions may, in fact, result from eyestrain. Sometimes female disease, ear disease, malaria, etc., are confused with eyestrain.

The cure for eyestrain is the wearing of proper glasses, not nose glasses. The eyes should be tested and the glasses fitted only after "drops" of certain medicines called "cycloplegics" have been placed in them to widen the pupils and steady the little ciliary muscles, thus assisting the oculist in testing them accurately. Opticians, optometrists, and others are not qualified to do this, nor have they been trained in recognizing the various diseases of the body which may cause eyestrain. It must be remembered that a fully trained physician, who must take 6 to 7 years to learn his profession, must then take a year or more additional training, preferably later in life, in order to become skilled enough to treat eye diseases scientifically and intelligently.

Blindness.—Many chronic diseases of the body affect the eyes, leading perhaps to total blindness without causing pain. The onset is often very gradual. For this reason it is foolish to have the eyes alone examined and to put on glasses when the trouble is elsewhere. Inflammation and disease of the eyegrounds (retinitis and optic neuritis) perhaps leading to blindness occur from many poisons used in the trades and from kidney disease, diabetes, high blood pressure, hardening of the arteries, tuberculosis, anemia, syphilis, etc. Hence the underlying cause or disease must be corrected to cure the eye trouble and prevent blindness. Especially workers in lead, arsenic, nitrobenzol, carbon bisulphide, anilin, carbon monoxide, and wood alcohol should give a care to partial or total blindness from these agents. Usually many other symptoms of these poisons are also present, blindness being only one feature.

Color Blindness.—Many workers are troubled with color blindness. Usually they do not know it until applying for a railroad job or something of the sort. Except in tobacco and alcohol users this condition cannot be prevented nor can it be cured. Persons naturally color blind should find out early in life through the method of physical examinations whether they are so afflicted and keep from picking out lines of work in which they cannot

advance if color blind. Usually inability to see a red color is the commonest form of color blindness. Men are said to be more afflicted than women.

Tobacco may cause great disturbance of eyesight and even lead to blindness. The trouble may set in so gradually that the person may be unable to tell when it began. The use of alcohol may cause the same condition. This form of optic-nerve inflammation causes a cloud to appear before the eyes and the victim may be able to see better in the evening than in the daytime. Also he finds it hard to distinguish red from green colors when held directly in front of the eyes, but he may be able to see them if held to one side. Seeing double is another common complaint. Wood alcohol often produces a prompt blindness, as is commonly read about from the use of "bootleg" whisky. Even its vapors sometimes produce blindness when inhaled as when painters shellac the inside of a big vat, tank, or other poorly ventilated space. Smokers, chewers, and drinkers who notice failing vision should take heed of these facts and see if things do not improve on relinquishing the habits. Rarely does excessive drinking of coffee, tea, and chocolate produce partial blindness; these drinks are more harmful to children, in whom vision has been found to be reduced to one-fifth of normal from these causes.

Proper Light.—The question of proper light for the use of the eyes is very important. An immense number of people work by insufficient daylight, particularly those who work in inside court rooms, at home, or after twilight has arrived. The best light comes from reflection from the sky and not directly from the sun. Also daylight should come mostly from the upper half of the window. One should not sit at a bench before a window so as to face the light, but should sit with the light coming from the side, preferably from the left side. Some garment factories have changed their sewing machines so as to have the light come in from the side. Dirty windows, opaque window shades, and dark walls stop or absorb much light and thus greatly reduce the light admitted into a work room whose benches or machines might otherwise be well lighted. Many of the surfaces upon which workers must fasten their eyes are very trying to the eyes, for instance, where the surface is dark and one must work upon it with dark material, like sewing upon dark cloth with dark thread. Here strong light should be used. On the other hand, light may be so bright as to cause glare. When the light strikes

one directly in the eyes, or when it is very bright, or when the surface upon which one has to look is very bright, glare is produced which causes eyestrain. Many of these conditions can be overcome by wearing an eyeshade and especially by changing the position of one's seat, but one should not wear dark glasses unless so instructed by an oculist.

Artificial lights, whether electric, gas, or oil, may also produce much eyestrain. Oftentimes the light is not strong enough or it is placed so that it shines directly in the face. Lights hung low should always be shaded. Sometimes the light is unsteady, as when it comes from a gas jet or when one tries to read on the train; both conditions are bad for the eyes. Much can be done with artificial lights by shading them with frosted globes or reflectors and raising them high up toward the ceiling, while at the same time a local light with a proper shade can be made to focus directly upon the work itself. For fine eye work it is always better to have a combination of a local light with less powerful light toward the ceiling for general room illumination. Work having dull or slightly tinted surfaces is preferable to work upon. Much reading matter is too small, poorly printed, and therefore very straining to the eyes. A foot-candle meter has now been perfected, costing about $25, which shows the amount of light actually falling on the working surface so that one may tell exactly whether a bench top or desk top is well enough lighted. The amount of artificial light required for reading purposes is placed at from 5 to 10 foot-candles, but twice as much would be better. Daylight should have no less than 2 foot-candles, while Nature herself, out of doors, supplies hundreds to thousands of foot-candles of light. Hence it is mostly a question of enough light with proper control to prevent glare.

Trying to save money by cutting down the use of electricity or gas for lighting purposes is very poor economy; eyestrain of workers, poor work, slow work, and accidents are the result. A careful contractor hesitates to place a job in a poorly lighted shop. The same should apply to mines, offices, and schoolrooms.

General Care of the Eyes.—In the general care of the eyes, remember that when normal they need no special attention to keep them so. They take care of themselves at least so far as eye lotions, eye waters, etc., are concerned. A person should never put ordinary water in the eye nor open the eyes under water. It causes inflamed eyes. Eyes do not need bathing with

eye cups, etc., to "make them strong." When the eyes are sore or injured, the only solution a lay person should put into the eyes is boric acid. This is used in concentrated or saturated strength and is made by putting a few crystals of boric acid in a tablespoonful of warm water. It is dropped into the eye, when needed, by pulling down the lower lid and holding the head back (or while lying down), and with the eyes looking upward or to one side. Use a clean medicine dropper for the purpose. As a general principle, treat inflamed or sore eyes with cold applications, but do not leave them on more than 10 to 20 minutes at a time.

FIG. 53.—Proper illumination on desk. (*Roslyn Earp in Hygeia.*)

Persons should not read while lying in bed on the back. Especially is this so when one is recovering from an illness, because the eyes are weak and are unable to stand even a light amount of work. Don't provide a sick friend with a book to read until he is well along to recovery. The eyes are frequently overused beyond all reason at one's regular work. It is remarkable that they endure as much strain and hard work as is placed upon them. They should be given only a fair day's work. They should be occasionally rested during work by looking from time to time at distant objects through a window or by changing the work for a spell. It must not be expected that after using the eyes all day in an office they can again be used for hours in the evening at the same kind of work.

Dr. Frank Allport, a noted oculist, says that one should hold his work, like a book or sewing, as far away from the eye as it can be seen with ease, as the farther away such work is held the less strain there is on the accommodation muscles. This should become a habit instead of the tendency to hold things too close to the face.

The health of the body in general has a great deal to do with the health and comfort of the eyes. In many persons hard work shows its affects first in the eyes, causing headache or a feeling of sleepiness which makes them think that they need a change of glasses every few months or so. As a matter of fact, they usually need the building up of a run-down system, more rest, and more outdoor exercise. Follow sensible rules of hygiene, and the eyes, provided glasses are correctly fitted where needed, will usually take care of themselves.

CHAPTER XIII

THE EARS

It is estimated that about one-third of people are more or less deaf in one or both ears. A great deal of deaf-and-dumbness is due simply to deafness. A person, being unable to hear, naturally cannot tell how to make sounds correctly with his mouth. It is remarkable how many persons will allow deafness to creep on in one ear without noticing it until that ear is practically "stone deaf."

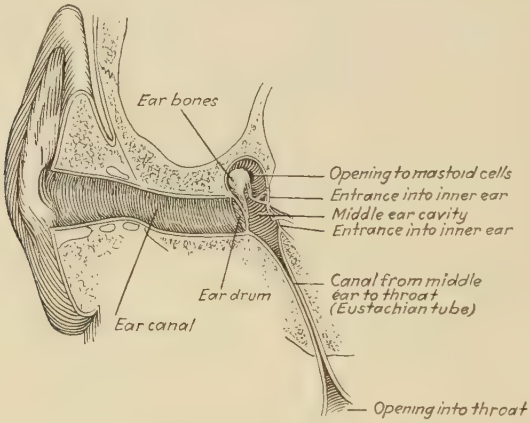


FIG. 54.—The external and internal ear canals are well shown in this schematic drawing.

Like the eyes, Nature intended the ears to take care of themselves; thus treatments of them are not necessary unless disease is present.

The usual tests for hearing are made with a watch, with the voice, by whispering, and with tuning forks. The voice is by far the most practical, and where one finds that he cannot hear a watch or some sound as easily as someone else, he should have his hearing tested. The expert in diseases in the ear is called an "aurist." He is not only a trained physician but, like the oculist, he has taken a year or more of special training, usually later in

life, in this specialty. Oftentimes a physician specializes in the diseases of all four—eye, ear, nose, and throat. This is because disease of one of these so often affects the others.

I am indebted to Dr. B. Alexander Randall of Philadelphia, Professor of Diseases of the Ear in the University of Pennsylvania, for most of my discussion of the hygiene and health of the ear. I have picked out only a few of the commoner of the afflictions of the ear.[1]

Piercing the ear lobes for earrings is a heathenish custom, dating back to the days when man was a savage. If carefully done, no permanent damage results, but too often ignorant persons do the trick who have no idea of cleanliness; thus the ear becomes infected. A single group of children may furnish many cases of abscesses, while blood diseases may be spread from one to another by the use of an infected needle. Colored people are apt to develop tumors on the ear (keloids) as large as the fist. Occasionally erysipelas results. There is nothing in the idea that piercing the ears is helpful to sore eyes. Lumps in the ear lobes or edges may be due to old injuries or to gout.

Wax forms in healthy ears of itself and helps to keep the ear canal clean and sterile or free of germs. It should never be cleaned out of the ears except when it hardens or swells, producing more or less deafness. Water makes it swell quickly and therefore should be kept out of the ears as much as possible. The movements of the jaws keep the wax moving toward the outside and also furnish exercise for the ear canal. Sudden closing of the ear with wax will result in sudden deafness, often with dizziness, nausea, and other extraordinary symptoms. There may be no pain in the ear. Pain is usually a sign of inflammation or infection. Dropping oil into the ear canal should never be done. The careful use of warm water with an ear syringe is the proper method for removing the wax. No stiff instruments, toothpicks, matches, hairpins, etc., should ever be put into the ear canal. The physician uses special instruments which are sterilized. Unless one works in much dust or great noise, he should not wear cotton in the ears, and when worn, it should be removed daily to keep the wax from obstructing the canal.

Foreign bodies had best be removed by a physician, as one is apt to push them in further. They can go only as far as the drum

[1] See PYLE's "Personal Hygiene," W. B. Saunders and Company, Philadelphia, 7th ed., pp. 139–170, 1920.

which is located about 1 inch inside, but one is apt to push them through the drum, bursting it, if efforts are persisted in. There is no hurry in removing a foreign body; hence one can wait until getting to a physician's office. Oftentimes rubbing in front of the ear while it is turned downward to one side will cause a small body to fall out. The jaws should be worked at the same time. Should it be necessary to look into the ear, stand in a good light, pull the ear lobe upward, backward, and outward. This straightens out the canal so that one can often see in as far as the drum.

Itching in the ear canal may be only accidental or, may be due to some constitutional disease. Oftentimes it means the beginning of an infection or a boil which, because of the small space, soon causes great pain. Infections are almost always due to probing about the ear with matches or hairpins or something in the hands of an ignorant person. Hot water dropped into the ear canal often gives great relief.

Molds sometimes grow in the ear canal, especially when some disease is present. They need cause little concern, but the ear should be thoroughly cleaned out.

Injury to the eardrum may result from compressed air. Even in going up and down an elevator a person may notice this. Rarified air as at high altitudes acts similarly. Opening the mouth relieves the condition and also swallowing once or twice. Randall says that the healthy eardrum can bear a pressure from either the inside or outside of 15 pounds to the square inch. The eardrum is often ruptured by inflammation on the inside of it, by explosions, by a "box" on the ear, and by even the slight suction of a kiss on the ear. Sometimes a drum is ruptured in violent coughing, as in whooping cough, or also in falls. Rupture of the drum of the ear, however, does not cause deafness. If no disease is present, it usually heals promptly. Most ruptures are due to the pressure of pus or fluid on the inside; pain is promptly relieved when the rupture takes place and the pus flows out. Even large openings in the drum do not lessen hearing very much and may close up nicely even after they have been present for years. Even when the entire drum is removed, it usually reforms. It should be kept present, however, as a protection to the middle ear and the mastoid cells which are located in the bone behind the ear.

Two-thirds of all ear troubles are located in the middle ear, a small cavity located on each side of the head in the base of the skull just inside of the ear drum, and practically all of these troubles are due to infections which have reached the middle ear from the throat through the connecting tube to each ear (the Eustachian tube). Every cold in the head tends to invade the ears and, while it usually recovers, infection often starts, followed by earache and a running ear. As a rule these gradually clear up, but more or less deafness may follow. If the discharge stops suddenly, it means a blocking up and is sure to be followed by something more serious, such as mastoid disease. The blocked-up infection may extend through the bone of the skull and reach the brain, causing meningitis and death.

FIG. 55.—Many times one is partially deaf, usually in one ear. An ear examination will discover this condition and treatment often results in restoring good hearing. (*Haven Emerson in Hygeia.*)

Causes of Deafness.—The usual causes of deafness are from diseases of the nose and throat, especially those accompanying scarlet fever, measles, diphtheria, influenza, typhoid fever, and smallpox. Sometimes deafness is hereditary, but oftentimes these cases are the result of one of the eruptive fevers early in life. Syphilis, whether inherited or acquired, often causes deafness, usually in both ears.

Certain occupations produce deafness known as "boilermaker's deafness." Any continually recurring, loud or piercing noise may do so; thus many workers are made partially deaf from early years of work life. The real solution, of course, is to prevent the noises, but where this is impossible, one may change the occupation. This should be considered by younger workers

especially, who may be looking forward to something better for future years. As a partial protection from noise, the ears may be plugged with cotton, or better still, special little rubber bags filled with alcohol may be used for this purpose.

Any odor coming from the ear should be investigated. Oftentimes persons who are thought to have foul breath really have diseased ears. An odor usually means disease of the bone around the ear canal—a dangerous condition, as a blood-clot may form or meningitis occur at any time.

Earache, like deafness, usually arises from a cold in the head, and from the same causes which produce disease of the middle ear (see p. 227). Any disease of the drum or the drum cavity may cause it. Sometimes small blisters or pustules on the drum are the reason. Cold water or cold air entering the ear and water in the nose passing up the connecting tube from the throat may cause earache. One of the most dangerous causes, leading oftentimes to infection, is the nasal douche with which one runs water or "drops" into the nose. Never use a nasal douche except under a physician's instructions. Sleeping at night with the side of the head exposed to cold drafts often produces great evil in the ear. Facial paralysis or "Bell's palsy" has been described on page 180. For those predisposed to ear trouble, the old-fashioned nightcap may be worn with great advantage. Wearing cotton in the ear does not offer enough protection, as it is the whole side of the head which must be kept from getting chilled. It is small wonder that a hardly noticeable earache during the day often develops into an acute pain an hour or two after going to bed.

The relief of an earache may be had by wearing a nightcap, by applying hot-water bags to the ear region, by pouring hot water into the upturned ear, or by syringing the canal gently with hot water. First drop the water on the back of the arm to see that it is not too hot to be borne. Leeches are often put behind the ears with good results. Rest in bed should be the rule, while one should eat only soft foods so that chewing efforts are reduced, and constipation should be relieved by proper means. Aspirin in 10-grain doses every hour or so for a few doses often helps ordinary earaches.

Noises in the ear are generally due to irritation by pressure at some point in the ear; also anemia, as well as too much blood, will produce them. Sometimes they are due to an irritation in

the nose, to an excitable heart, or to disease in the brain. Persistent noises are also complained of by the insane. Some otherwise sane persons will give serious attention to imaginary voice sounds or hallucinations which they hear. Dr. Wilmer tells of persons suffering from carbon-monoxide poisoning from a leaky furnace pipe who swore they heard voices, although no others were around. Noises in the ear should always be investigated, but they often mean nothing serious.

Ear Trumpets.—Aids for the deaf have very uncertain value. Dr. Randall says that none have half the value or field of usefulness claimed by their inventors. This means both artificial ear drums as well as trumpets. Ear trumpets are usually valuable in direct proportion to their size. The larger ones catch a greater proportion of sound waves and direct them into the ear. Small or inconspicuous ones are usually of little value. Those of fan-shape which are held in the teeth may prove a real help. The deaf person should obtain advice as to the kind of instrument to test out and then try a number of that form. Electric telephone instruments are often valuable, but much use of any telephone may be dangerously fatiguing.

Mastoid disease, an infection in the bony projection behind the ear, is always a serious affliction. Usually nothing can be seen on the outside. This is because the disease starts in the air cells located inside the bone at this position. Great pain is often present, but often there is only an uncomfortable feeling. It practically always follows an earache, *i.e.*, an infection of the middle ear. The bony projection behind the ear is usually painful when pressed upon. Sometimes bulging is seen, but this is rare. The pus inside may rupture into the brain cavity, causing meningitis and death, or into the jugular vein, where it produces general blood poisoning with chills, fever, and sweats, or sometimes a blood clot forms which breaks loose, floats downward in the veins to the heart, and causes sudden death. Usually chronic (long-lasting) disease of the ear, which has a history of past earaches, occasional spells of discharge, spells of pain, more or less deafness or foul odor, is due to mastoid disease. One is strongly urged to take no chances with mastoid disease but to seek competent medical aid at once.

CHAPTER XIV

THE GLANDS OF INTERNAL SECRETION

Certain small organs in the body have been found to be very important for its growth and health and some, even, for the maintenance of life. These are: the thyroid gland located in the neck, the pancreas located in the abdominal cavity, the ovaries in the female and testicles in the male, and the suprarenal bodies located on the upper parts of the kidneys. There are several others of these glands which are beyond our consideration here, such as the pituitary body and the pineal body attached to the brain, the thymus in the upper part of the chest, the spleen, and others. In fact it seems that most organs of the body may secrete substances called internal secretions, or hormones, which promote or regulate the health of other organs and parts.

Thyroid Gland.—Interest in the thyroid gland lies in the fact that, when diseased, it produces a condition known as "goiter" which is very prevalent, and becoming much more so in certain parts of the United States and Canada. Goiter is of several kinds, but by far the most common form is that in which there is a simple rounded enlargement in the lower front of the neck, much more common in girls and young women than men, and giving a "swan neck" appearance. Usually this form of goiter has no noticeable symptoms, but sometimes it grows inwardly and surrounds and squeezes the windpipe, or it may grow down into the chest and do likewise.

Sometimes, however, perhaps without much growth at all, the thyroid gland produces a posioning of the body which makes one very nervous, the outspread fingers tremble, the heart beats fast, one is excited much of the time, sweats a good deal, often has looseness of the bowels, poor sleep, irregular appetite, and perhaps very large or prominent eyes, so that the person is called "pop-eyed" (exophthalmic goiter).

On the other hand, the thyroid gland may not grow as fast as the body and thus may not produce enough of its secretion. In infants and children this often shows itself as underweight,

stunting of growth, dwarfing, and sometimes great feebleminded-ness and idiocy. In older persons, if the gland is not active enough, a number of symptoms known as "hypothyroidism" occur, such as unaccountable coldness of hands and feet, chilliness, shivering spells, low temperature, great likelihood to colds, neuralgia, lumbago, wryneck, blueness of the face, hands, or feet, small swellings in various parts of the body, and a loss of part of the outer end of one or both eyebrows. In more marked cases mentality becomes dulled, swelling of the tissues occurs

(*Gould and Pyle*)

FIG. 56.—This giantess and dwarf are the results of abnormalities in the glands of internal secretion. (*Walter B. Cannon in Hygeia.*)

about the face, neck, and shoulders, and the person shows slow movements (myxedema).

It has been discovered that the purpose of the thyroid gland is to regulate the rate of repair and growth in the body, which it does by cooperating with the other glands of internal secretion, and with good digestion and absorption of food from the intestinal tract. Hence the gland has more to do during periods of growth or rapid repair; it enlarges much more frequently in girls and women because of menstruation, pregnancy, and

nursing. Women at the change of life are often greatly benefited when the physician prescribes a little thyroid extract or measured amounts of iodine for them.

It has also been discovered that the chief cause of goiter is the absence of enough iodine in the food or water which a person ingests. It has further been found that this very necessary element, iodine, has disappeared from the soils of mountainous districts and higher altitudes, including our Great Lakes region and, in fact, more or less of the entire northern half of the United States, with the exception of the sea coast. Iodine occurs in nature as sodium iodide, a very soluble substance, which the rains and floods of thousands of years of time have dissolved out of the soil and carried to the ocean. Hence ocean water always contains iodine, while fresh water rarely does. Also animals and man living in or about the oceans rarely have goiter because they are continually getting some iodine either in the water which they drink, or in the sea foods which they eat and perhaps in the air which they breathe. It has further been found that common salt (sodium chloride) when obtained from the evaporation of sea water, as was the custom in ancient times, always contains sodium iodide as well as sodium chloride but when man began to get his salt from inland sources, like salt mines and salt wells, then to purify it so as to make it fine and white and easy flowing in salt shakers, the iodine disappeared. The result has been a rapid increase in goiter in the past 30 or 40 years throughout the northern portion of the United States. The southern states have been of more recent geological elevation above the sea so that their soils and their wells and springs still contain iodine, as a rule.

Only a few years ago Marine and Kimball, two physicians in Cleveland and Akron, Ohio, proved that 50 per cent of the children there had goiter and that the disease could be entirely prevented by giving them a grain of sodium iodide each day for 10 days twice a year. This discovery caused others to investigate usual foods and water for iodine, and to prove its almost universal absence in places where goiter is common. On the other hand, plenty of iodine is usually found in food or water, or both, where goiter is rare. Thus cause and effect have been traced so that we now have a positive preventive, and in many cases an absolute cure, for goiter by the taking of a small amount of iodine.

One of the most logical things to do is to use salt containing the normal proportion of iodine which it originally had when made from evaporating sea water; thus a great many salt companies are now putting on the market iodized salt which contains one part in five thousand of sodium iodide. In other places iodide is being added to the city water supply. In still others little chocolate tablets containing iodine are being supplied to school children, the rate being one tablet each week.

There is no evidence that the normal thyroid gland is damaged in any way by taking iodine, even if one were to get it in several of these different ways at the same time. The amounts given to prevent goiter are hundreds of times less than are usually given by the physician for the treatment of some definite disease; also much less than may be found in iodine-containing foods and water. Even when a goiter of the toxic kind is present, the small amounts of iodine usually help it. However, one is strongly advised to go to a physician whenever there is a goiter of any size or when nervous symptoms are present, so that they may be sure the iodine is going to help instead of harm them.

There is evidence also that polluted or infected water supplies may so bind iodine that it is not of use to the body even when drunk. Likewise, too much fatty foods and perhaps some diseases of the bowels may prevent iodine from being absorbed into the body even after it is taken by mouth, but in the great majority of instances a minute trace of iodine taken by mouth or gotten through the plentiful eating of sea foods will prevent goiter.

The pancreas is located deep back in the abdominal cavity below the stomach where its duct opens into the small bowel. It is known as one of the "sweetbreads" which we commonly see in animals. It has a light color and breaks up easily, when handled, into small lumps resembling cottage cheese. It secretes powerful digestive juices which act in the intestinal tract, but it also makes an internal secretion which is absorbed into the blood and prevents the disease known as "diabetes mellitus" or "sugar disease." It does this through its secretion which oxidizes or burns up any extra amount of sugar which accumulates in the blood.

For some unknown reason disease often occurs in the pancreas, which prevents the formation of this internal secretion; thus sugar piles up in the blood and appears in the urine and one is said

to suffer from diabetes. Without doubt the eating of excessive amounts of sugar in the form of candy, sugared foods, and desserts is one of the causes of this disease of the pancreas which usually begins to show itself about middle life. Sometimes it starts in childhood. The later in life the disease appears the better is the outlook.

A person with diabetes suffers from an increased appetite, extra thirst, gradual, though slow, emaciation, loss of strength, disturbed sleep, having to arise frequently at night and also during the day to empty the bladder, oftentimes eczema especially about the private parts, a tendency to boils and carbuncles, and finally convulsions which may end in death. The person is also restless and uneasy, and, strange to say, has an extra craving for sweet things.

In 1923 three Canadian physicians, Banting, Best, and MacLeod startled the medical world with the announcement of the discovery of insulin, a substance which will take the place of this internal secretion of the pancreas. In the present form insulin has to be injected daily in order to oxidize the sugar in the blood. One might ask if the disease itself could not be stopped by stopping the eating of sugar but this is usually not possible, because a large part of the food which we eat, including meats, fats, and starches as well as ordinary sugar is changed into sugar (glucose) in the body. It is also necessary that persons taking insulin, which has to be given hypodermically, shall follow careful instructions in regard to diet and other matters as given them by the physician. This sugar disease has been increasing at rapid bounds in the United States in the past 50 years, especially in persons over 40 years of age. Diabetes is said to be almost unknown among savage races and those living natural lives and eating plain foods. It was also very infrequent among our grandparents and great-grandparents. It is, in short, undoubtedly a disease due to the so-called "civilized man's diet" as described in Chap. V.

The sexual glands, called "ovaries" in the female and "testicles" in the male, produce internal secretions as well as create the well-recognized sex cells which, when combined, male and female, start the growth of a new individual. These internal secretions are apparently small in amount until the age of puberty, or 12 to 14 years of age. At about this time, when menstruation first appears in girls and occasional discharges appear in boys, this

internal secretion begins to affect the growth of the individual so as to develop the girl into a woman and the boy into a man. If anything happens to the ovaries in the one case or the testicles in the other, this difference between the two sexes is absent to a very large extent. In the case of the girl, her body grows muscular, angular, and more like that of a man, her voice may change to a deeper tone, her breasts fail to develop as they should, menstruation ceases, and, of course, she becomes incapable of bearing children. In the case of the boy, his voice fails to change but stays high pitched and mellow like that of a girl, his form and development are more rounded, his fatty tissues increase, even the bony parts come to resemble more those of a woman, his growth is usually decreased, and his sexual organs fail to develop. He also lacks the strength, judgment, self-control, etc., characteristic of a normal man. He is, of course, incapable of becoming a father.

It is thought that several forms of insanity are due to the absence of these internal secretions from the sexual glands, and also that self-abuse and sexual excesses tend to disturb these internal secretions so that there is a lessened absorption of them into the blood. We have in recent years read in the newspapers accounts of restoring of "man-power" by the grafting of glands of monkeys or other males into men, especially old men. This is on the theory just explained that these internal secretions will be restored and produce their usual effects, particularly in the direction of sexual passion. However, this theory and its practical application are found wanting and a certain few people who have been so treated and have thought they were "restored" have found to their chagrin that it was undoubtedly all imagination, and in one or two instances, such persons have died of sudden heart failure because of their attempts at renewed and juvenile activities. A body once worn out and senile cannot be restored apparently by any such means, and the stimulants added only act as a whip to bring death closer.

The suprarenal glands, called also "adrenal" glands or bodies, are mentioned simply to show the great importance of these glands of internal secretion even when we know nothing about how to protect them in their functions or purposes and very little more about how to aid them when diseased. These glands produce a substance called "suprarenalin," or "adrenalin," which is absorbed into the blood very quickly upon any excitement and

thus makes us suddenly able to meet a given situation. It makes the heart beat faster and the breath come faster, and sometimes one is hardly able to control himself. Yet it enormously increases one's strength, turns fatigue into complete forgetfulness that any such condition is present, and in other ways aids our muscles, blood vessels, and tissues to perform their duties or meet an emergency. The substance seems to act also in cooperation with the thyroid secretion and with the other internal secretions. Suprarenalin is given hypodermically for conditions of shock, collapse, asthma, serum sickness, hay fever, low blood pressure, etc., and it is often used to stop hemorrhages and shrivel up mucous membranes by injecting it or placing it directly upon the places desired. It is such a powerful drug, however, that it must always be used under careful supervision of one who understands it.

The factors which make good health in the suprarenal glands are not known, but apparently everything which good habits bring about are necessary. A common disease of these glands is tuberculosis, which is usually already present in the abdomen or kidneys and can easily spread to these glands. Fortunately the glands are very rarely diseased to a dangerous extent, but there is no doubt they are often weak or inefficient in persons who have lost their "pep," will power, and stick-to-it-iveness.

CHAPTER XV

CANCER

Forms of Cancer.—Cancer has two forms, the most frequent called "carcinoma" and occurring usually after middle life, and the other called "sarcoma," occurring at any age, but more likely to occur before middle life and characterized by a very rapid growth in inside tissues anywhere, with rapid spread through the blood and, except for the occasional history of an injury to the given part, having no preceding cause nor precancerous conditions or symptoms. Fortunately sarcoma is comparatively rare. Its treatment consists of quick and radical operation or amputation while X-ray and radium have an uncertain influence over it.

The rest of the discussion will be concerned with the form of cancer called "carcinoma" which grows from the skin, mucous membranes, or linings of certain organs and parts.

The Cause of Cancer.—The nature of cancer, said Dr. John N. Hurty, for many years Health Commissioner of Indiana, is as hidden as the methods to cure it are clear and well known. It occurs in all animals and in all races of man. It is not contagious. It cannot even be transferred from one person to another, and because it never relents when it starts and never produces an immunity to itself, it is not considered to be a germ disease. In man it is not proved to be hereditary, although it occurs so frequently that when several cases happen in the generations of one family it might look so. According to Dr. Maude Slye, a Chicago research worker, however, cancer is definitely hereditary in certain strains of mice in which its occurrence can be foretold according to the Mendelian laws of hereditary. There are no such things as cancer houses, cancer streets, or cancer localities. It is not a blood disease, but in late stages spreads both by the blood and lymph vessels. It is nothing to be ashamed of and kept hidden. Persons suspecting it save their lives by announcing it at once. Persons who are cured through operations for cancer should herald it in order to encourage others.

So far I have discussed what cancer is not due to. While its cause is not known, certain associations are common. Chief

among these is previous irritation of the part of the body where the cancer starts. This may be irritation of the stomach or bowels from the wrong kind of food; of the lips or mouth by smoking (in this connection this form of cancer is limited almost to men); to irritation from tight clothing, as in the breast in women,[1] and the wearing of belts in both sexes; irritation from chronic infection as of the womb in women who have borne children or of the bladder in old men; irritation from parasites as the liver fluke in Africa; and finally irritation from certain things used by workers for a long time, such as paraffin, tar, pitch, soot, anilin, arsenic, and X-ray exposures, while even sunlight eventually produces it in the wrinkled skins of old persons. Many believe that eating too much is a cause, as it seems to be much more prevalent in wealthy nations and during good times.

Injury sometimes seems to be a cause, especially injury or irritation of an ulcer, an old scar, a birthmark, a mole (particularly a dark-colored or hairy mole), injury to lumps in the breast, etc. It seems that gallstones are frequently followed by cancer of the liver.

The Frequency of Cancer.—Cancer is increasing according to authentic reports at the rate of about 2 per cent per year. In 10 years its rate of death has steadily increased from 74 to 86 per 100,000 in the United States. It is most common where civilization has reached its greatest intensity, therefore, in large cities rather than in rural districts. This may be because of better diagnosis in cities. Also as life expectancy has increased 15 years in the past half century, many more people live to the cancer age. The disease is said to be rare in American Indians, in the native Hindus, in native Egyptians, and apparently among savages in general. Dr. H. G. Wells of the University of Chicago, however, maintains that statistics of causes of death among these races are not to be trusted and that certain definite investigations have shown cancer to be very prevalent among Hindus, Eskimos, and other native and uncivilized races, when they reach 35 to 40 years of age.

The rate in New York is 104 and in San Francisco, 161.8, while in some of our southern cities it is as low as 32. The disease ranks among the "big four" in causes of death, being surpassed in Ohio,

[1] A recent report from South Africa states that cancer of the breast is becoming frequent in the native negro women only since they have taken to wearing corsets.

for instance, only by circulatory diseases and pneumonia. It is now causing approximately 100,000 deaths a year in the United States. At its present rate of increase of from one to two points per year, it will soon be the major cause of death unless something is discovered to stop it, or its victims heed the advice to call in the surgeon on the first appearance of symptoms. Of 100 males 10 years of age and over, 8 now die of cancer whereas only 7 die of tuberculosis. From the age of 35 on, 1 out of every 8 women and 1 out of every 11 men die of cancer. Over 95 per cent of cancer occurs after 35 years of age.

The Warning Signs of Cancer.—Cancer nearly always gives evidence of its presence while in its early stage and still curable by operation. A lump appearing anywhere, as in the breast, should have a physician's immediate attention. Bleeding now and then, or bloody discharge from any part of the body is a sign. In fact, any unaccountable discharge in women after 35 years of age is a sign; so, also, in both sexes from the rectum. A sore that does not heal, as about the tongue, lips, mouth, or anywhere, is a sign. A drawing-in of the nipple or a puckering of the skin anywhere is a sign. Persistent indigestion usually (but not always) with loss of weight is a sign (see p. 68).

One should never wait until a lump is noticed or can be felt in the stomach or abdominal cavity. To wait until pain comes in any lump, sore, or discharge is the gravest of errors. There are no blood tests for cancer. Even where blood tests may show syphilis, cancer may also be present and should be thought of. The X-ray may be used to help in the finding of cancer in the stomach and bowels.

The great frequency of cancer in women is due to its occurring so commonly in the breast, all of which are curable by early operation, and in the womb, 25 to 75 per cent of which are curable by operation. Men and women have cancer of the stomach and liver with about equal frequency, of which about 50 per cent are curable by operation. Of those of the bowels, about 75 per cent can be cured by operation. Those of the lip, mouth, and skin are most easily cured because so soon discovered and unable to be hidden.

The Outlook in Cancer.—None ever get well who let a cancer proceed. The disease is not like typhoid fever which runs its course and, if death does not occur during this time, ultimately ceases and one gets well. Cancer steadily plows its way on until

one is dead. Fortunately it always begins in one place and stays limited to that place for several months before it begins to spread. It then takes several months to grow locally before it finally breaks loose and starts other cancers elsewhere in the body.

If removed while it is local it is invariably cured. If removed with all of its outlying roots when it is beginning to spread, it may be cured. After it has spread it is useless to try to remove it.

Without operative interference, or occasionally, treatments by the X-ray or radium, it usually causes death within 1½ to 3 years, the last 6 months of which time one is practically bed ridden and under morphine to withstand the pain. If there is no sign of its return for a 3-year period after an operation, it is usually considered permanently cured. The outlook is of course much better if cancer occurs in certain parts of the body as on the skin or extremities than in others; yet over half of the cancer occurring even in the digestive tract can be cured by operation if the early symptoms are heeded.

The Control of Cancer.—Cancer cannot be prevented. It is a matter of control. Precancerous conditions like warts, moles, lumps, ulcers, fissures, or cracks should be removed in order to prevent cancer. Cancer is controlled by one's own effort and not by the public health official. All he can do is to help in the education of people and in the setting up of dispensaries and clinics for cancer. A person's private physician is his only health officer in this matter. When man provides for his body the same degree of safety inspection that he does for the automobile, the passenger train, and the elevator, the deaths from cancer will be comparatively small. No disease illustrates better than cancer the need of the periodic health examination.

Stop irritation by attention to food, clothing, smoking, pressure, friction, etc., as mentioned under Cause above. Irritation may cause a lump which is not cancerous, as in the breast, but if it does not disappear within 2 or 3 weeks after stopping the irritation it has probably started a cancer. A 30-year-old woman got a lump in her breast from leaning against a high desk. It disappeared in a short time when this cause was called to her attention. All cancer is first local and at this time is permanently curable by operation. In nearly four-fifths of cases it is in regions accessible to the surgeon; therefore, four-fifths of cancer deaths should theoretically be prevented. An exploratory operation is invariably justifiable to establish the early diagnosis of cancer.

The majority of cancer deaths are due to delay in seeing a physician and are unnecessary. Unfortunately many physicians wait too long before insisting on an operation. The "wait and see" policy should cause you to seek another physician at once, because the diagnosis of the cause of any of the warning signs mentioned above should be and can be made at once. "Waiting to see" is not necessary. The large majority of people still come to the surgeon too late for treatment, because the cancer has reached an inoperable stage and death is a foregone conclusion. X-ray treatments and radium may be used for cancer of the skin but should be used in conjunction with a surgeon's supervision in practically all other cancers. They are principally useful before and after surgical operations to kill anything left, and to stop hemorrhages from inoperable cancers.

The most vicious aspect of the cancer problem is the enormous amount of quackery, heartless money-getting, and childish ignorance displayed in connection with promised cures. There are no medical cures for cancer, no serum treatment, no electrical treatments other than the X-ray or radium, no electronic treatments, no vaccines, no special herbs or barks, no Indian cures, no mental cures, no divine healing known to affect it, and no cancer pastes or plasters which will remove or cure it. Attention to any such methods simply delays relief. The knife is today the only certain cure and it must be used early in the course of the disease. Delay is more than dangerous; it is deadly. A half operation is worse than none at all.

The fatalism which says, "If it's cancer, I might as well give up," is foolish, cowardly, and suicidal. In the mind of one who has developed cancer and faces the knife, this question arises, "What chance have I?" The answer is grim enough but perfect, "Other than the knife no chance whatever." It is not too much to say that with prompt diagnosis as many persons with cancer would recover as do with consumption. Timeliness and the knife are the saving hope.

Cancer should be made a reportable disease in order to get statistics about it and also to see that proper control or methods of cure are being followed. For the same reason, upon all persons who die with anything resembling cancer, usually a long-drawn-out illness not definitely diagnosed, an autopsy or post mortem should be held.

Many scientific experts and research workers are devoting their lives to find the cause of cancer. Millions of dollars are being spent annually upon the search. Thousands of animals are being used. An American Society for the Control of Cancer has been formed with state branches and local city units. Your health officer can tell you about it. This society furnishes free literature, organizes cancer diagnosis clinics, and otherwise aids those afflicted. On undergoing an operation for cancer, remember that modern surgery is painless, quick, and highly successful. The risk is not in operating but in waiting.

CHAPTER XVI

THE WAR ON THE MICROBE

So many diseases are caused by microbes, that is, germs, and other very small parasites which either live off man's tissues or compete with him for existence that a special chapter is devoted to the subject.

These very small forms of life have been seen under the simple microscope for nearly 250 years, or since the perfection of that instrument in 1674 by Anthony van Leeuwenhoek, a Dutch lens maker. The smallest of them are called "bacteria" while those somewhat larger and also differing in structure are called "protozoa," or one-celled organisms. Of these two groups, the bacteria produce by far the most disease in man. The many-celled or larger organisms, called "metazoa," or "animalicules" (little animals), sometimes cause disease. Among these parasites are ringworm, lice, fleas, several kinds of insects and even some plants like molds, yeast, and slimy growths.

Bacteria are the smallest of living things. They are considered to be plants. Some of them are capable of moving about, while others lie motionless or are carried by water and other fluids in which they are placed or grow. There are thousands of kinds of bacteria but less than 50 or 60 species of them are dangerous to man. Most of them live in the soil or water and are really beneficial to us. Several varieties live in our own intestinal tracts and are great aids to us both in breaking down food and in keeping out dangerous bacteria. Some of them, however, produce disease in man, others in animals, and some in both animals and man. Their sizes vary. Some are so small that they cannot be seen under the most powerful microscope and their presence is determined by looking at their enlarged shadows or by the fact that they will not pass through porcelain filters while liquids will. Others are easily seen as rods which may be two or three times the diameter of a red blood corpuscle (whose diameter is about $\frac{7}{1{,}000}$ millimeter, there being 25 millimeters to the inch).

Bacteria are customarily divided into three great families according to whether they are rod shaped (called "bacilli"), spherical shaped (called "micrococci"), or screw-like in form (called "spirilla"). A single rod bacterium is called a "bacillus"; a single sphere, a "micrococcus"; and a single screw-form, a "spirillum," the spelling in the parentheses above being the plural forms.

One form rarely if ever changes into the other, but some of the rod forms are sometimes so short as almost to resemble spheres. Some of the rod forms have leg-like appendages (flagella) and can move about rapidly in water or fluid. The spirilla are usually able to move with a screw-like motion. The spherical

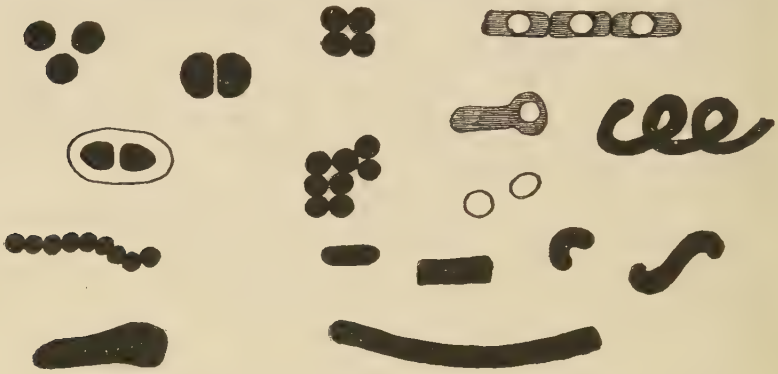


FIG. 57.—Various forms of bacteria. (*Thomas.*)

forms, however, which represent some of the most deadly ones, are incapable of motion; yet this does not seem to deter them much in getting from one human victim to another.

The harmful bacteria "grow," that is, increase in numbers very rapidly if placed in a food or in man's tissues where conditions are favorable. It is said that they multiply at the rate of once every half hour, from which it can be seen that one germ might become an uncountable number within 24 hours if nothing happens to stop its rate of reproduction. All bacteria, however, require certain kinds of food, the right temperature, the right amount of air and light, or the absence of air and light, in order to increase their numbers, or "grow."

It is because man has carefully studied the habits of bacteria that he has succeeded in making conditions so unfavorable for some of them that they have disappeared, or practically disap-

peared, which means that some diseases which they cause have ceased to exist. This is true of yellow fever and almost true of plague, cholera, and a number of other pestilences which formerly scourged civilized countries. One should ask his physician to show him some bacteria under a microscope when occasion offers. He may be able to show you the bacteria or germs which cause diphtheria, tuberculosis, sore throat, gonorrhea, and others.

Fortunately for man, very few of the bacteria which produce disease in him can withstand drying, intense light, or starvation. Only three or four of them, lockjaw, anthrax, botulinus, and the gas bacillus, are capable of tiding over an unfavorable condition such as I have mentioned. These do this by their ability to form "spores" or hibernating forms. These spores may then survive for many years, awaiting an opportunity to get into a moist, warm place where there is something to live upon, when they again become active, reproduce, and perhaps make their poisons. Since few of our disease-producing bacteria are able to change themselves into spores, they ought theoretically to be easily destroyed, for their tribes or races must keep on constantly reproducing or the whole group or mass dies off quickly and permanently. Those which can keep moisture about them the longest usually live the longest.

In only a few instances has man discovered how to kill bacteria in his body, that is, those which are really inside the tissues or in the blood, without killing or so damaging the tissues themselves that they also die. But he has discovered how to make his own tissues and sometimes those of lower animals build up antidotes or substances which are deadly to the bacteria. These antidotes, etc., are called "antibodies," and consist of antitoxins, vaccines, and serums. Sometimes the doctor uses the bacteria themselves, when they are in a weakened form, to stimulate the body to produce protective substances which will keep the more deadly strains of the bacteria out. This is the method used in vaccinating for smallpox where a feeble strain of the smallpox virus is developed by having the virus grow in the skin of the belly of the calf. Similarly, man has discovered that diphtheria germs ordinarily will not kill a horse, but that the horse when inoculated by such germs will produce a protective substance called "antitoxin" which we can get by drawing off some of the horse's blood to protect ourselves from this disease, and even to stop it very quickly when it is present. Our scientists made these discoveries

by studying carefully with the aid of the microscope and of chemicals to see how animals cured themselves, or checked a disease given to them.

In learning the tricks of these things, many thousands of animals have been used and also many vaccines and serums have been discovered which protect the lower animals as well as man against the diseases which infest them. This is especially important to stock and poultry raisers when we consider the deadly diseases which some animals have, like hog cholera, rabies (hydrophobia), chicken cholera, etc. Thus, if for no other reason,

FIG. 58.—The mother has smallpox but her daughter who has been vaccinated is immune and will not catch the disease even though she is directly exposed, as shown in the illustration. (*Victor C. Vaughn in Hygeia.*)

man has been justified in sacrificing numbers of lower animals for experimental purposes in order to discover means to stop, and perhaps wipe out, such fearful diseases as the black plague, rabies, diphtheria, smallpox, cholera, pneumonia, tuberculosis, infantile paralysis, etc.

Some people do not believe that germs cause disease. One of the strongest evidences that they are wrong lies in the fact that certain diseases are never present unless the germs are there also. Furthermore, these same germs, placed or "inoculated" into another susceptible person or animal, will immediately produce that same identical disease.

Again, some people believe that germs are not the cause of disease, but that some faulty habit of living, or unsanitary condition, has so reduced the resistance of the person that the disease results and that certain germs come to live in them as a mold grows on the outside of the end of a ham, which would not do so unless physical conditions were just right. There is some truth in this belief for some germ diseases, such as tuberculosis, but it is easily proved that the most resistant person may develop a given disease simply by getting an extra large dose of the proper germs.

Finally, certain diseases like diphtheria are being made to disappear entirely by bringing about, not better sanitary conditions in the surroundings of the person, but by "immunizing" the person, that is, protecting him by vaccination alone. Thus, in the recent severe smallpox epidemic in Detroit, nobody developed smallpox who had been vaccinated within 5 years and none developed the hemorrhagic or black form of smallpox who had ever been vaccinated. Yet 123 out of 124 who had not been vaccinated and who developed the black form died. In all, there were some 900 cases of smallpox with 140 deaths, all cases and deaths occurring among persons who had either never been vaccinated or had not been revaccinated within a period of 5 years. About 900,000 persons in Detroit were vaccinated during the course of the epidemic and prevented from getting smallpox. When this was done, the epidemic stopped as if by magic.

While vaccination may cause some other complication now and then—estimated at not over once in ten thousand times as against the fact that a person may easily lose his life by having smallpox—it is by far the lesser of two evils. So true is this that people are to be pitied who still object to vaccination because there may be some very remote danger in it. In colonial days, as during the Revolutionary War, it is said that nine out of ten people had smallpox, and a person with a "clear face" was the exception; but this was nearly a generation before Jenner discovered the facts about vaccination and proved that it would prevent smallpox, even though one slept with a smallpox victim.

The public should be warned of the propaganda of misguided, ignorant, or designing antivaccinationists, antivivisectionists, and antiscientists in general. They would wreck our civilization in a few weeks' time and perhaps permit the black plague or some

other fearful pestilence, which we have discovered how to control, to wipe us off without the "ghost of a show."

There is no doubt, in fact, that previous races of men, whose remains, implements, works of art, and buildings we find scattered over the earth's surface, have succumbed to battles with bacteria in the form of great pestilences, and not to battles with animals or other tribes of men whom they could see and fight in the open. This theory is, in fact, one of the best ones we have for the sudden

FIG. 59.—This old colonial poster is interesting since the absence of smallpox pits was a method of identification in those days. (*Courtesy Metropolitan Life Insurance Company*, with modifications.)

disappearance of the great race of Moundbuilders who were once scattered over this country and lived here perhaps within the past 1,000 years. Something wiped these numerous people off very suddenly. Who can say that it was not the great black plague which visited Europe in the years 1345–1350 and, it is estimated, destroyed 25,000,000 people, or one-third of the entire population and, in many places, all of it!

Man's study of germ diseases, using animals principally for experimental purposes, will never permit such a disaster to happen again in the civilized world, and, while there are some diseases,

like influenza, which are not yet understood and therefore controlled, it is only a matter of time before all germ diseases will be conquered.

This brings us to a discussion of the methods used in stopping the spread of epidemic and communicable diseases. It is impossible to stop these unless the general public cooperates intelligently, which means that the people must understand the general principles. Germ diseases are "caught" or spread by four differ-

(*Pacific and Atlantic*)

FIG. 60.—Even dogs are vaccinated, this one to prevent rabies.

ent methods, some by one method only, but some by all four of them:

1. Most germ diseases are caught by coming in direct touch, that is, contact with a person who is sick with the given disease. Of course the nature of the sickness may not be recognized at the time. This contact may be by handling, kissing, sexual intercourse, etc., so that the germs succeed in getting into the mouth, nose, or sexual organs by direct transfer from the sick person to the well one.

Germs very rarely get in through the skin, which is quite germproof. With some diseases like those of the nose, throat, and

lungs, however, one need get only into approximate contact with the sick person, so that moisture "droplets," caused by sneezing, coughing, or loud talking, carry the germs a few feet through the air to a person close by. Usually this is a matter of not over 5 or 6 feet, beyond which range one is usually safe.

Again, one may occupy a seat or bed, or handle a doorknob, postage stamp, street car transfer, money, etc., which has just been touched or handled by a diseased person. Here, the danger has been found to be a matter of how long moisture will remain under such circumstances, for practically all disease germs die quickly when moisture disappears. Therefore, if the object touched still holds some of the sputum, bowel discharge, urine, sweat, or perhaps moist fingerprints of the sick person and one handles these objects, especially in a manner to get them into his mouth, the germs may be transferred. One great danger of this kind is the use of dishes, especially where they are barely dried before someone else uses them, but the same is true also of water faucets, washbowls, washrags, towels, cups, pencils, etc. Not only dryness but sunlight quickly destroys germs left upon objects.

2. Diseases are often caught by coming in direct touch or contact with a "carrier" of the germs. A carrier is a person who has the germs somewhere in his system (nose, throat, lungs, bowels, genital organs, or elsewhere), but who does not have any symptoms of the disease, at least at that time. Carriers spread disease germs just as sick persons do, that is, by coughing, sneezing, bowel or urine discharges, leaving moisture imprints upon things which they handle, etc., so that the germs get to someone else. Because carriers look like healthy persons, they are even more dangerous in the spread of germs than sick persons. One danger is that we do not keep the skin of our own fingers and hands which have picked up disease germs from going to our mouths or from being put in food and drink which later goes into our mouths.

These carriers of disease may have the germs only a few minutes or hours, as, for instance, a careless nurse or ignorant caretaker, mother, etc.; yet this is all that is necessary to transfer them from a sick person to a well one. It is for this reason that we have quarantine laws and isolate those who are sick with communicable diseases and all of the carriers or exposed persons if we can find them. Many times persons have a disease so lightly, for example, scarlet fever or diphtheria, that the illness

is not suspected even by themselves. Such persons are called "missed cases" of the disease and yet it can be seen that they are even more dangerous than carriers. Many persons are carrying the germs of a disease and spreading them who are just about to come down with the disease themselves. This is especially true of meningitis, influenza, tonsillitis, smallpox, measles, whooping cough, scarlet fever, and diphtheria. Such persons are called "incipient carriers." Others have gotten over the illness but still have the germs and keep on spreading them. These are called "convalescent carriers," as of such diseases as syphilis, gonorrhea, typhoid fever, diphtheria, and scarlet fever.

Finally, some persons fail to get rid of the germs after having the disease, or even without having had it, over months or years of time. These are called "chronic carriers," of which typhoid fever is the best-known example. Fortunately, chronic carriers are not very numerous but one can see how dangerous a cook, who is a chronic typhoid-fever carrier, can be to a community. A most famous example of this is "Typhoid Mary" who, while now under close supervision, persists in getting jobs as a cook in institutions or asylums, whenever she can, with the result that several severe typhoid epidemics have been traced to her. Chronic carriers sometimes occur among people who handle milk and food; hence our gradually extending laws requiring the examination of food handlers, milkmen, etc. Carriers of disease are much more numerous when epidemics are present; thus our laws cover "exposed persons," that is, "carriers," as well as those who are actually sick.

3. Sometimes disease germs are spread by other means than human beings. Such means are called "vectors." These vectors may be insects such as flies, mosquitoes, lice, bedbugs, fleas, roaches, ticks, etc.; or they may be small animals like rats, mice, squirrels, gophers, etc.; or they may be our common domestic animals like dogs, which spread rabies; cats, which may spread diphtheria and whooping cough; or sheep, which may spread anthrax, tick fever, etc.; or cows, which may spread tuberculosis; and horses, which may spread lockjaw. Of all these forms of life we are most fearful of flies, mosquitoes, and lice, while rats are especially to be feared as the spreaders of the "black plague," also called "bubonic plague." Some of these diseases, like the black plague, once started, will spread from man to man, as was the case in the recent epidemic of black plague in

the Mexican section of Los Angeles where 34 persons died who had attended the funeral of a person unknowingly dead of the plague. On the other hand, certain diseases like malaria are not spread directly from person to person, but always require some other animal or insect, in this case the mosquito, to do the transferring. Thus, one part of the life cycle of the parasite is spent in man and one part in some insect or animal. A curious Chinese disease requires that one stage of the parasite shall live in

(*International Health Board*)

FIG. 61.—All of these worms were living in the bowel tract of this little fellow. He was also a sufferer from hookworms. (*Asa C. Chandler in Hygeia.*)

fish, the next in a snail, and the third in man. Flies are excellent spreaders of disease because they visit garbage piles, privies, dead bodies, and filthy places, and then come to our food, milk, etc. They are known as "mechanical carriers," as they merely pick up germs and cart them about on their legs and wings, and even in their digestive tracts. One fly can carry a million typhoid-fever germs, it is said.

Things which spread disease may not be alive. Such non-human carriers or spreaders, sometimes called "inanimate

vectors," are liquids like water, milk, dishwater, washwater, swimming pools, etc.; or watery solids, like foods, fresh vegetables from manured gardens, canned goods, etc.; also wet things in general; and some have thought gases might spread disease.

This latter fear of air-borne diseases, still believed in by many people, is not true. Germs do not take wings and fly. Even when picked up by a gust of wind, as from a sick room, disease germs are so quickly scattered out and killed by drying and light that a person outside of the window is in no danger from this source. When in the air, germs must usually be upon moisture droplets or moist dust in order to remain alive, which means that they are not borne very far, usually not over a few feet from the sick person, as already explained on page 128. If upon dust particles, they are usually promptly dried out and killed, except the few spore-bearing forms which rarely endanger us by the air route. The germs of tuberculosis are fairly resistant to drying.

Sewer gas does not carry germs, though it may be otherwise harmful. Bad odors do not carry germs. Even the breath or expired air from a sick person who is breathing quietly does not carry the germs of his disease. However, as already stated, his droplets from sneezing and coughing are very apt to carry disease germs, particularly if he is suffering from a respiratory disease.

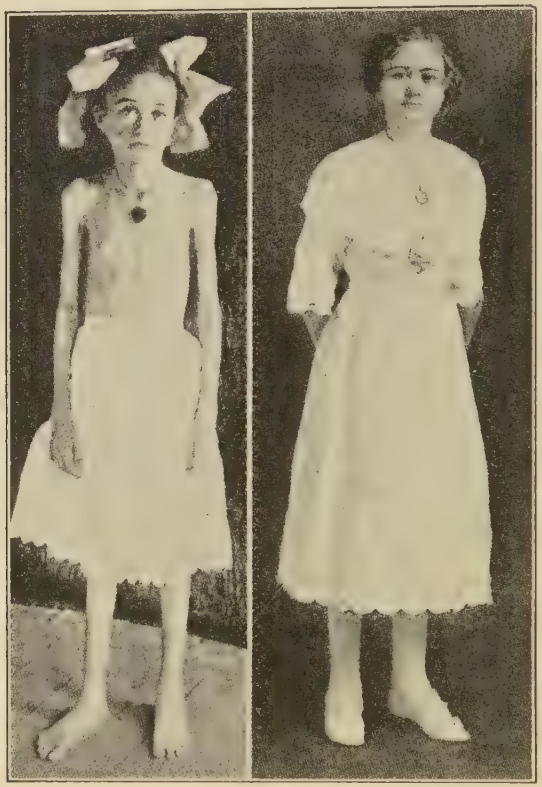
4. Fomites, or things which have been handled by sick persons so long before that there is no moisture from fingerprints or discharges left upon them or in them, very rarely spread disease. Sometimes it looks as if scarlet fever, smallpox, and diphtheria might be spread in this way, as by sending a doll from one house to another or by means of library books, etc., but such is very unlikely.

To sum up, then, most diseases are caught by susceptible persons who have come in actual contact with the sick person, or with a "carrier" of the disease, or by eating food infected by foul discharges, by flies, or by diseased food-handlers.

The larger parasites like ringworm, lice, bedbugs, fleas, etc. may be caught from towels, clothing, bedding, and even in, or about, toilets, thus differing somewhat from germs. Germs die so quickly when away from the human body or "host" that there is not so much likelihood of "catching" them in toilets as might occur with these larger parasites. It is for this reason that many stores will not permit certain kinds of clothing to be brought back for exchange, such as underclothing, furs, and bedding.

The danger is practically altogether one of vermin or parasites, and not of germs.

The battle against microbes follows certain general principles. The more these are understood by the people in general, the quicker will each germ, parasite, and microbic enemy be conquered. Each person should be a soldier in this war whether he



(*International Health Board*)

Fig. 62.—These are two pictures of the same 16 year old girl, one before and the other after being cured of hookworm disease. (*Asa C. Chandler in Hygeia.*)

becomes a victim or not to the fury of battle. Disinfection is one of the oldest methods tried and is very important where it can be applied. This usually means that disinfection is limited to the surroundings and the discharges coming from sick persons or animals rather than the disinfecting of persons themselves. Different places and articles should be disinfected as follows:

Rooms occupied by the sick should be screened, well aired, and sunned. Carpets and rugs should be removed and the floors left bare. Clothing, bed clothes, etc., should be steamed, boiled in strong soap suds, or fumigated with strong formaldehyde solution. They should then be hung in the sunlight. Mattresses (both sides) should be hung in the sunlight for several hours. Carpets and rugs may be treated with the vacuum cleaner and then sunned or fumigated or steamed. Door knobs should be wiped off with 3 to 5 per cent carbolic acid. Floors and mopboards in sick rooms should be cleaned by scrubbing with plenty of soap and water every day.

It is impossible to fumigate or disinfect the air while a person is in it, nor is this necessary. After the sick person has been removed from the room, there is also no necessity of fumigating the air. Plenty of airing, sunlight, scrubbing and cleaning, with repapering and painting or varnishing is regarded as sufficient sterilization for all ordinary communicable diseases. Those which may be spread by insects or small animals may be fumigated for preferably by substances like hydrocyanic acid gas, tear gas, sulphur fumes, etc., practically all of which should be left to the health officials, as these substances are too dangerous in the hands of lay persons. Repapering and painting are again very helpful here. Kerosene is good for putting into cracks, bed springs, etc., for bedbugs, lice and fleas.

Body discharges require various treatments to disinfect them. Stools and urine should be collected in vessels containing 5 per cent carbolic acid, or milk of lime (1 quart of dry, freshly slaked lime[1] to 5 quarts of water), or chlorinated lime (6 ounces to a gallon of water), or 10 per cent formaldehyde solution, and exposed thus for 2 hours, after breaking up particles with a stick and before emptying into closets or privies. Sputum and nose discharges should be caught on cotton cloths or gauze (not handkerchiefs), or in paper sputum cups, and all burned. In case handkerchiefs are used, they should be soaked in carbolic acid and then boiled. If covered sputum cups are used, they should contain milk-of-lime solution or carbolic acid. Where cuspidors are used, they should contain 10 per cent milk of lime and, after clean-

[1] To make slaked lime, pour a small quantity of water on a lump of quicklime. It will become hot, crumble, and fall into a dry powder when the slaking is complete. It is then added to water to make "milk of lime." Unslaked lime should not be used.

ing, be disinfected with 5 per cent carbolic acid or 10 per cent formaldehyde solution.

If books are infected, which is rarely the case, they should be stood on end, opened up, in a covered can and some formaldehyde solution poured in the bottom where they are kept for at least 24 hours.

If one is suspicious of drinking water, it should be boiled and then cooled. Liquid chlorine, one-fifth to one part per million, is used for disinfecting water on a big scale. Milk should be pasteurized, or may be boiled for 2 to 3 minutes. Thermometers should be disinfected by rubbing with strong soap, rinsing, and then immersing in 70 per cent alcohol. All dishware used by the sick should be immediately cleaned, the scraps either burned at once or put into the disinfecting solution used for body discharges, then the dishes boiled separate from those of the family, and kept separate to be used only for the sick person.

Privy vaults should be made flytight and be ventilated with a stack to the top of the privy roof. There should be added daily, or after each use, a small sprinkling of lime or chlorinated lime. Even dry ashes or dry dirt are good. Their contents should be removed frequently. Cesspools should have milk of lime added daily.

All disinfection should take place continuously, as fast as discharges occur from the sick person or as objects are removed from the room. This is called "concurrent disinfection." Disinfection of things after the person's illness is not of such importance, but its methods of use are the same as for continuous disinfection. This is called "terminal disinfection."

The strategy of the half-century campaign against germ diseases is now being conducted as follows:[1]

1. Diagnosis of the disease is the first step necessary in order to determine which germ or parasite is causing it. Similarly the cause of an epidemic must be determined.

2. Specific prevention, that is, a method which makes one immune to that particular disease, can be used in coping with certain germ diseases. Thus vaccination prevents smallpox;

[1] Let us point out that the prevention of disease is called "prophylaxis"; exposures of certain persons to disease-producing substances (toxins) may cause an increased liability or "sensitization" to the disease which is called "anaphylaxis." Of course this latter phenomenon should be prevented as much as possible and some of the means are now known.

another form of vaccination prevents typhoid fever; toxin-antitoxin injections prevent diphtheria; several other diseases have had specific vaccines, serums, and substances discovered which will prevent them. In the great Salem, Ohio, typhoid-fever epidemic of the winter of 1919–1920, nearly 1,000 cases occurred among a population of about 10,000 people, or a rate of 10 per cent; yet among some 225 returned service men in the city who had been vaccinated against typhoid fever in the Army, not over 2 suspicious cases developed, or a rate of less than 1 per cent.

3. Specific abortive treatment is the means by which certain diseases can be stopped or aborted after their germs have been implanted and before symptoms have appeared, *i.e.*, during the incubation period. Examples are hydrophobia, diphtheria, smallpox, and perhaps whooping cough, scarlet fever, some forms of pneumonia, influenza, common colds, meningitis, and others. There is, of course, a time limit beyond which abortive treatment is useless; the earlier or quicker the specific treatment is given, the better the chances of stopping the disease.

4. Cures for certain diseases are also specific or practically so, such as quinine for malaria, iodine for common goiter, salvarsan for syphilis, antitoxin for diphtheria, scarlet fever, etc., and a few others.

5. Stimulation of persons in the midst of an infection often arouses the body's powers to throw off the disease. The kind of stimulation has to be decided upon by the trained physician.

6. Building up of good resistance is an important thing in the prevention of microbic diseases. Here the correction of physical defects, removal of bad teeth, tonsils, pus pockets, etc., is the idea. Habits which mar health, such as the abuse of alcohol, overeating rich foods, worry, and loss of sleep, must be stopped. Hunger, fatigue, and particularly chilling of the body are important in lowering one's resistance.

7. Nourishment as measured by weight, size, strength, and endurance, is not much of a factor in preventing microbic diseases but it is important in assisting one to battle with them and to prevent complications. Thus it is seen that the strong and vigorous do catch influenza, typhoid fever, measles, smallpox, etc., just as easily as the weak and delicate. Immunity and resistance are built up apparently on other things than strength and big development; chiefly, we believe, upon a past life of good habits,

8. Sanitation of the surroundings, in order to clean out germs, parasites, insects, and small animals like mice and rats which may transfer diseases, destroys many of the camping grounds and breeding places of our enemies. Thus pure water supplies, filtration plants, sewage disposal systems and plants, garbage[1] and refuse disposal methods, tearing down old buildings and shacks, etc., afford great protection.

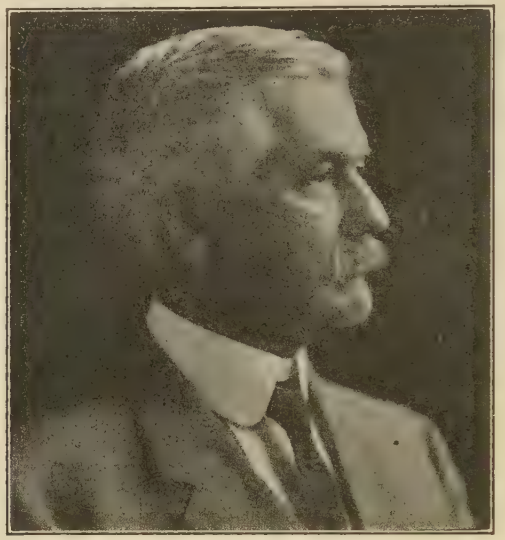


FIG. 63.—Gen. William C. Gorgas, conqueror of yellow fever and the tropics. (*Arthus I. Kendal in Hygeia.*)

9. Quarantine is the prevention of the spread of an infection to others by isolating the sick person in a room or quarters by himself, controlling contacts or those who have come in contact with him until all possibility of their spreading disease has passed, and the impounding of all infectious material coming from the person or premises for the purpose of destruction or disinfection. To make quarantine effective, warning signs, certain boundaries, time limits, police jurisdiction, and penalties have to be established by laws or health regulations.

[1] An excellent garbage container is a galvanized-iron pail set down into a larger iron bucket or small cement vault sunk into the ground, with a trap lid on the top which can be opened with the foot. This is flytight and dogtight, will not freeze, is easily disinfected with a little lime, and is practically non-odorous. It is also not an eyesore in the back yard. The garbage collector should empty it about twice a week.

10. Isolation of the individual means his complete separation from susceptible persons who might catch his disease, and the separation of carriers of microbes to prevent their spreading the same. Occasionally the well person is isolated to keep him from catching the disease. Isolation can be carried out best in hospitals. Special contagious-disease hospitals are not essential but more expedient. With the help of a nurse, and sometimes with only the aid of a visiting public health nurse, isolation can be carried out successfully in the home.

11. Disinfection, as explained above, must be continuous (concurrent) as well as at the end of a germ illness or an epidemic (see p. 256). Many advertised so-called "disinfectants" are worthless, especially those claimed to disinfect the air while permitting persons to remain in the room; also most disinfecting soaps or solutions to be used upon the skin.

On the other hand, many substances are antiseptics, *i.e.*, they will prevent any more germs from growing, but do not actually kill those present. An example is boric acid solution. Iodine solution or tincture of iodine, Dakin's solution (chlorazene), and "rubbing alcohol" come about the nearest to anything we have as disinfectants for use on the human body. Special antiseptics have been discovered for use *in* the body. Peroxide of hydrogen is not to be trusted as an antiseptic, although it is more powerful when fresh than boric acid. It rapidly loses strength once the bottle has been opened. It should not be used for injections into cavities like the ears.

One thing always to remember is that *disinfectants are poisonous* when taken internally. Therefore, always keep them in some receptacle such as a special bottle easily distinguished from others or in a container wound with adhesive tape. Furthermore, be sure the container is properly labeled and kept out of the reach of children. It is wisest never to keep bichloride of mercury (corrosive sublimate), either in tablet form or otherwise, about the house. Leave the use of this substance to the doctor or nurse. It is often mistaken for aspirin, salol, soda tablets, etc.[1] Likewise always keep lye out of the pantry or medicine cabinet and away from children.

[1] If taken by mistake, induce vomiting at once by tickling the throat, drinking soap water or a tablespoonful of mustard in a small cup of water; follow with whites of 4 eggs in a quart of water or in milk; then induce vomiting again.

Thorough airing and exposure to the sun is the method of room disinfection to be preferred to fumigation.

On the above lines of battle there are prospects that the war on the microbe may be brought to a successful termination within perhaps the next half century, so far as civilized man is concerned. As stated in Chap. II, it is hoped that when diseases due to germs are conquered, human ill health, except perhaps in extreme old age, will largely disappear. Indeed, since the major epidemics, which are like onslaughts of an enemy through our encampment, are being stopped one after the other, the end of the combat begins to seem like a realization.

CHAPTER XVII

MISCELLANEOUS ITEMS OF IMPORTANCE AND GENERAL ADVICE

A number of apparently minor things which, however, have vital importance when certain occasions arise are yet to be discussed.

See that all contagious diseases are reported to health authorities both in your family and among your neighbors. This is the attending physician's duty, but oftentimes a doctor is not called promptly, if at all, in light cases of many communicable diseases. Yet these are just as "catching" as the severe forms.

It is best to consider all beginning sickness in children as contagious and to keep sick children separated from others until the character of the disease is known. Most contagious diseases are spread in their earliest stages, perhaps even more so than later. Also but one single exposure for a brief minute is usually all that is necessary.

The health officer not only placards with a quarantine sign, but explains many valuable things about the control of the disease, determines who may be permitted to enter and leave the house, and the question of school attendance for others in the family. He is interested in seeing that the sick one gets well promptly, thus reducing the chances that others may contract the disease.

It is only a question of time before there will be heavy penalties for spreading communicable diseases, whether through carelessness or ignorance. Even now many lawsuits have been fought and won for carelessness in spreading a disease; *e.g.*, typhoid fever gotten from a polluted water supply in a factory; botulinus food poisoning from spoiled canned goods; septic sore throat from infected milk; the spread of diphtheria, scarlet fever, etc.

See that all occupational diseases or any sickness apparently associated with one's daily work are reported to the health authorities, whether there are any laws requiring it or not. If you live in a state where compensation insurance is paid for

industrial accidents or occupational diseases, see that your claim is filed early, because time limits are set on all of these matters. Your physician should be asked about this. Help your fellow worker to do likewise. The more that occupational diseases are reported to factory inspectors or health officers, the more promptly will faulty conditions of work be corrected and the more likely will compensatory insurance be paid. Complaint should never be withheld when based upon facts, since the lives and well-being of others are usually endangered as well. One always has a just claim for an occupational disease, the same as for an industrial accident.

Each person should have the date of his birth registered in the office of the health department or local registrar of vital statistics in the city or district where he was born. Better still, he should have a certified copy of his birth certificate. There are 18 good reasons affecting both the health and welfare of an individual showing why he should have a birth certificate: (1) proof of age; (2) proof of parenthood; (3) proof of nationality; (4) proof of right of inheritance to property; (5) proof of right to mothers' pensions by showing age of children; (6) proof of right to workmens' compensation; (7) school enrolment requires an age record; (8) employment in many states and countries requires proof of age in minors, and sometimes in adults; (9) graduation certificates and the right to practice certain professions require a record of age; (10) the United States and state civil service examinations require a record of age; (11) life insurance and savings to be paid back in old age (annuities) require a birth record; (12) the birth certificate is a proof of the right to vote; (13) jury duty requires proof of citizenship and adult age; (14) many office positions require proof of citizenship and age; (15) military service and exemption from same requires proof of age; (16) marriage licenses are usually granted only to those over a certain age; (17) passports to travel in certain countries require proof of the date of birth; (18) proof of right for protection as an American citizen can thus be had in foreign countries.

The parent should be certain that the doctor reports the child's birth immediately to the proper authorities. Go, or write, to your health officer or county clerk for a copy of any birth record you wish to keep for yourself or others in your family. Usually a small fee of about 25 cents is asked for this certificate. If

you were born where no official record was made of it, have your mother or father or some witness of the time and place of your birth go before a notary public and swear to a birth affidavit for you.

WHEN ONCE DOWN, WHAT THEN?

Since the health and life of civilized man is never certain, not guaranteed, and not self-perpetuating, and therefore requires the constant exercise of his wits and wisdom to keep going and especially to keep going upon the right track, the wise person will always consider what to do in case his health or powers fail him. His first thought is, aid from some organization to which he belongs (or should belong, if he does not), and hence workmen as well as other groups have set up fraternal insurances, benefit organizations, etc.

Insurance against sickness or accident is the only logical method of meeting the unforeseen. Just as a man insures his house against fire or his automobile against theft or his valuable cow against mishap, so should every individual carry sickness or health insurance as well as accident insurance. It is quite impossible for this to be done successfully except upon a big scale, by which the benefits to be paid are spread out in small amounts over a large number of persons who contribute premiums or payments to keep the plan going. Even the boy and girl should be taught that a part of their first earning should be put into insurance against ill health and possible death. The life insurance aspect has been so well promoted by the large insurance companies that few persons have escaped being visited by their agents, and most persons carry life insurance for themselves and children although the amounts are often too small.

With the government regulation which insurance companies now have, insurance should not be considered a risky or even an expensive investment. In truth it costs enough, but the larger companies are continually reducing their rates and offering more and more benefits. The young man, in my opinion should take out life insurance, whether fraternal or "old line," before he marries, before he buys a single piece of furniture, before he takes his vacation, and in fact, before he allows himself to consider any pleasure or indulgence, and before almost any other investment. A recommended order for spending one's wages or salary

might well be: food, clothing, shelter, insurance,[1] legitimate debts, housing extension, investments, recreation, and finally indulgences or things which are not needed at all.

Benjamin Franklin, in his "Poor Richard's Almanac," pointed out, when the people complained of taxes, that the "taxes" which they voluntarily placed upon themselves by indulgences and foolish expenditures cost them much more than the regular taxes and other necessary expenditures they were forced to make by law.

Workers in some establishments are required to carry both sickness and accident insurance and in others even old-age pensions. Again, some companies insure all of their employes by a plan of "group insurance," in which the premiums are all paid by the company as a rule. Irrespective of these general welfare schemes, I have seen so much of suffering, poverty, the breaking up of families, the death of little ones, of mothers, and old people as the result of the physical breakdown of the father or provider of the family, that I strongly advise each one to carry, as an individual matter and as a genuine investment, sickness, accident, and life insurance. In this matter, probably one-fourth as much should be spent for health and accident insurance as for the first "old line" life insurance policy taken out.

Remember that your chances in life are usually not so good as those of your children and that the wise person will take every opportunity to advance his children's chances through healthy upbringing, education, moral and religious influences. He will for this reason keep himself as well informed, as strong in body and mind, and as careful in his associations and forms of recreation as he can. Soon he must be the object of consideration and contemplation by the next generation if he grows old and, for his own good alone if not for this next generation, he will do his best to establish an appreciation of his efforts while young and in his prime.

In the many things which constitute a full, rounded, and happy life we have to discuss here the matter of health alone, believing it to be one of the most important, if not the most important, of all the factors concerned. With health we have a tool or weapon

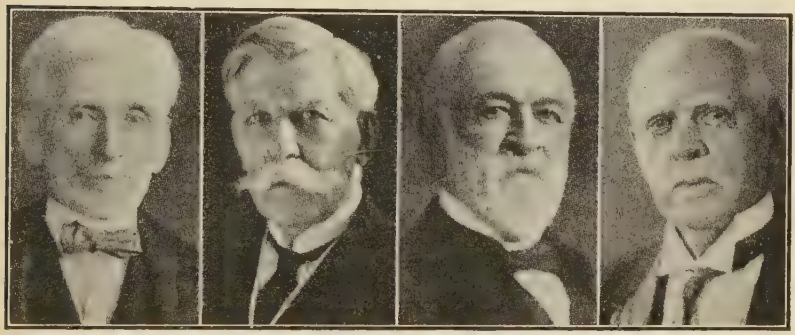
[1] In the case of the head of the family there is some question whether paying up the insurance premiums should not come before everything else, even if charity may have to be called upon. Each case must be settled for itself.

which enables us to succeed with practically all of the other factors and ideals which go to make up life. For this reason a summary is in order.

RULES FOR PERSONAL HEALTH

1. Ventilate every room you occupy. Man is not a house animal. Not all is known about Nature's fresh air, but enough is known of its influences to warrant recommending it highly for as many hours of the day as possible.

2. Wear light-weight, loose, and porous clothing. Arrange to remove layers of outer garments when the atmosphere becomes



(*Underwood and Underwood*)

FIG. 64.—Here are four active leaders who have passed the fourscore mark. From left to right are: 1. Justice Joseph McKenna of the U. S. Supreme Court, whose keen legal mind is undimmed by fourscore and one years. 2. Oliver Wendell Holmes, the oldest justice with the U. S. Supreme Court, whose alert mind is functioning at 83. 3. Charles Manly Stedman, 83, who represented the fifth district of North Carolina in the Sixty-eighth Congress. 4. General Isaac Sherwood, 89, the oldest representative ever to sit in the House. He represented the ninth district of Ohio. (*B. C. Hampton in Hygeia, July, 1925.*)

too warm. Expose the whole body to an air bath and, if possible, a sunlight bath once daily, as when dressing or shaving in the morning.

3. Get out of doors. Get out without wraps for a few minutes several times a day if possible, for the stimulating effects.

4. When resting for recreation, be sure you are not dissipating by indulging bad habits.

5. Breathe night air. Open your bedroom windows. Sleep in cold but not in drafty rooms. Have no fires in bedrooms.

6. Breathe deeply on two or three occasions each day and in a fresh atmosphere, as by climbing outside stairs, or by taking short runs or light exercise.

7. Avoid overeating and overweight.

8. Get back to Nature in the matter of foods which you eat. Remember that Nature's original food products are grains, vegetables, fruits, nuts, meat, milk, eggs, and water. Man's elaboration of many of these items results in concentrated food products, on the one hand, and deficient food products on the other. Some have said that the grocery store offers a better meal from the health viewpoint than the dining room or restaurant.

9. Select your diet widely from all of the natural food products mentioned in the preceding paragraph; get a certain part fresh every day, *i.e.*, not canned, boxed, or bottled; eat the whole slowly and with cheerfulness, leaving your appetite to be your guide, provided you eat slowly. Curtail your appetite on man's changed foods. Drop fads and foolish notions. Chew well, and most dyspepsia will disappear. Don't "diet" except upon medical advice.

10. Go to stool regularly and frequently.

11. Stand, sit, and walk erect, but relax frequently. Walk and stand in the position of strength—toes straight to the front. While inactive, avoid drafts or cooler air currents against the back, neck, and legs. Keep the feet warm and the head cool.

12. Do not allow the well-known habit poisons such as alcoholic drinks, concentrated beverages and foods, and delicacies of all types to damage the body. Give particular attention to infections, colds, and sore throat in the first stages in which they appear.

13. Keep the teeth and gums healthy. Keep them clean. Eat fruits at the end of meals in order to help accomplish this. Clean the teeth before going to bed. See a dentist at least once a year. Nature's foods as listed in rule 8 above help to preserve the teeth.

14. The secret of great personal power is work, rest, play, and sleep in moderation. Never permit a piece of worrisome work or strain of any kind to go along without frequent interruptions in the nature of relaxations and change of posture, or turning to something else at times. This applies to both mental and physical work.

15. Keep serene no matter what happens. The wise man never shows anger or worry. He keeps his composure, but seeks at once to find the truth, to act quickly and thoroughly when he

sees the situation rightly, and to see that similar mistakes or causes for grievance do not happen again.

As a final object one should aim to keep well and to give a "sickness excuse" for absence from work as little as possible; yet be sensible and don't work when because of ill health you should not.

While it is true that we have but one life to live and the majority are probably "blighted" to more or less extent in physical well-being by the time adult age is reached (according to the findings of present-day physical and psychical examinations), the powers of adaptation are almost unbelievable and the tendency to improve and live is marvelous.

The use of knowledge now at hand and discussed in part in the preceding pages would prohibit perhaps half of the sickness or disability which now surrounds us. Likewise the knowledge at hand for exalting our personal powers, and thus making our "heads save our heels" through the following of correct habits of living and thinking, is extensive and is always worth investigating; it is not a secret of the "experts" only, nor of those who have grown old "and therefore wise," but comes as a result of the study and observation of the laws of truth as applied to human lives.

Sometimes, to repeat Edward Everett Hale, one may live long by getting an incurable disease and nourishing it carefully, but it is far safer not to acquire such a burden at all and to use one's spare time and abilities in the pursuit of happiness and the assisting of others in their plights or in developing their ideals.

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